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ABSTRACT

Unit nonresponse causes bias in survey estimates when the outcomes of respondents and nonrespondents are different. In the National Postsecondary Student Aid Study of 1999-2000 (NPSAS:2000) there were three levels of response, one of which was computer-assisted telephone interview (CATI) response. Because the response rates were less than 70% in some sectors or overall, an analysis was conducted to determine if CATI estimates were significantly biased due to CATI nonresponse. Through other databases, considerable information was available about CATI nonrespondents to this survey, and these data were used to analyze and reduce bias. The distribution of several variables using the design-based, adjusted weights for study respondents were found to be biased before CATI nonresponse adjustments. The CATI nonresponse and poststratification procedures, however, reduced the bias for these variables, and when the weighting was completed, no variables available for most respondent and nonrespondents had significant bias for all students combined. The bias was significantly reduced, and the remaining bias is small. Section 2 discusses the characterization of the bias before CATI nonresponse adjustment, and section 3 describes the weight adjustments used to reduce bias. Section 4 describes the bias for CATI variables, and section 5 discusses the bias remaining after weight adjustments. Section 6 discusses the overall predictive ability of the three nonresponse models, and section 7 presents conclusions. (SLD)

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National Postsecondary Student Aid Study 1999–2000 (NPSAS:2000), CATI Nonresponse Bias Analysis Report

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1. Introduction

Unit nonresponse causes bias in survey estimates when the outcomes of respondents and nonrespondents are different. For NPSAS:2000, there were three levels of response: institution response defined as the institution providing an enrollment list for sampling, computer-assisted data entry (CADE) response, and computer-assisted telephone interview (CATI) response. A CATI respondent was defined as any sample member who completed at least Section A of the CATI interview, an abbreviated interview, or paper-copy of the interview.

Additionally, a CADE respondent was defined as any sample member for whom the CADE:

- financial aid gate question was answered, AND
- enrollment section had some enrollment data provided, AND
- student characteristics section had at least one valid response for the set of items: date-of-birth; marital status; race; and sex. If the case matched to the Department of Education's Central Processing System (CPS), it was considered to have successfully met this criterion.

A study respondent was defined as any sample member who was either a CATI respondent, a CADE respondent, or both.

The following weighted response rates were obtained:

- institution - 91.3 percent
- CADE - 97.1 percent
- CATI - 71.9 percent
- overall (institution rate X CATI rate) – 65.6 percent.

Because the response rates were less than 70 percent in some sectors or overall, an analysis was conducted to determine if CATI estimates were significantly biased due to CATI nonresponse. For NPSAS:2000, data were collected not only from students using CATI and from institutions using CADE but also from databases such as the Department of Education's financial aid Central Processing System and National Student Loan Data System (NSLDS).. Therefore, considerable information was known for CATI nonrespondents and these data were used to analyze and reduce the bias. The distributions of several variables using the design-based, adjusted weights for study respondents (study weights) were found to be biased *before* CATI nonresponse adjustments. The CATI nonresponse and poststratification procedures, however, reduced the bias for these variables. When the weighting was completed, no variables available for most respondents and nonrespondents had significant bias for all students combined. The bias was significantly reduced, and the remaining bias is small. Section 2 discusses the characterization of bias before CATI nonresponse adjustment, section 3 describes the weight adjustments used to reduce bias, section 4 describes the bias for CATI variables,

section 5 discusses the bias remaining after weight adjustments, section 6 assesses the overall predictive ability of the three nonresponse models, and section 7 presents conclusions.

2. Bias Before CATI Nonresponse Adjustment

CATI respondents and nonrespondents were characterized by comparing the weighted[1] percentage of CATI respondents with the weighted percentage of CATI nonrespondents for each category of important characteristics known for both respondents and nonrespondents. T-tests were performed to determine if the difference between respondents and nonrespondents was significant at the five percent level.

Table 1 compares demographic characteristics of CATI respondents and nonrespondents for all students combined and also shows the full sample distribution. This table shows that the distributions of many student demographic characteristics, such as age, race, ethnicity, sex, student type, fall enrollment status, and receipt of aid are significantly different for CATI respondents and nonrespondents. Some institution characteristics, such as level, control, and region, are also are significantly different for CATI respondents and nonrespondents. Some of the statistically significant differences are not large differences, but aid recipients are clearly more likely to be respondents. When the differences between CATI respondents and nonrespondents are significant, the bias is also significant, as described below. Note that many of the variables in this table are derived from multiple sources that could influence the results if additional information obtained in CATI could be the reason for a difference between respondents and nonrespondents. Footnotes to table 1 indicate the primary data sources.

The nonresponse bias was estimated for variables known for both respondents and nonrespondents. The bias in an estimated mean based on CATI respondents, $\bar{y}_R$, is the difference between this mean and the target parameter, , i.e., the mean that would be estimated if a complete census of the target population was conducted. This bias can be expressed as follows:

$$B(\bar{y}_R) = \bar{y}_r - \pi .$$

The estimated mean based on CATI nonrespondents, $\bar{y}_{NR}$, can be computed if data for the particular variable for most of the nonrespondents is available. The estimation of π is as follows:

$$\hat{\pi} = (1-\eta)\bar{y}_R + \eta\bar{y}_{NR}$$

where η is the weighted unit nonresponse rate. Therefore, the bias can be estimated as follows:

$$\hat{B}(\bar{y}_R) = \bar{y}_R - \hat{\pi}$$

or equivalently

[1] The study weights and imputed data were used.

$$\hat{B}(\bar{y}_R) = \eta(\bar{y}_R - \bar{y}_{NR}) \quad .$$

This formula shows that the estimate of the nonresponse bias is the difference between the mean for CATI respondents and nonrespondents multiplied by the weighted nonresponse rate. The variance of the bias was then computed using Taylor Series estimation in RTI's software package SUDAAN.

Tables 2, 3, 4, and 5 show the nonresponse bias before and after weight adjustments for selected variables for all students, baccalaureate recipients, all undergraduate students, and graduate/first-professional students, respectively. The first set of columns in tables 2 through 5 shows the estimated bias before CATI nonresponse adjustment and imputation for the variables available for most responding and nonresponding students. The respondent and nonrespondent counts and means do not match those in table 1 because table 1 included imputed data and tables 2 through 5 did not include imputed data for the before CATI nonresponse adjustment estimates. Also, no categories for missing data were included in tables 2 through 5. A few variables have no before-adjustment results because they had high levels of missing data. T-tests were used to test each level of the variables for significance of the bias at the 0.05/(c-1) significance level, where c is the number of categories within the primary variable. Below and in table 6 are summaries of the *before-adjustment* significant bias across the four tables:

- at least one level of most of the variables is biased for at least one student type
- Pell grant amount categories are biased only for all students combined and Stafford loan categories are biased only for undergraduate students
- two variables are biased for two student types; five variables are biased for three student types; and twelve variables are biased for all four student types
- Pell grant amount and Stafford loan amount are not biased for any of the student types
- 20 variables are biased for all students combined; 17 variables are biased for baccalaureate recipients, 18 variables are biased for undergraduate students, and 14 variables are biased for graduate/first-professional students
- significant biases are usually small and sometimes are due to small sample sizes.

Weighting adjustments reduced bias to the extent possible as described in sections 3 and 5.

Table 1.—Comparison of NPSAS:2000 CATI respondents and nonrespondents for all students

Variable	CATI respondents		CATI nonrespondents		Full sample	
	Sample size	Percent estimate[1]	Sample size	Percent estimate[1]	Sample size	Percent estimate[1]
Age[2]						
19 or younger	6,480	19.5	2,560	19.0	9,030	19.3
20 to 23	16,140	31.2	6,290	32.2	22,420	31.5
24 to 29	9,380	19.3	4,140	21.8*	13,510	20.1
30 to 39	6,910	16.1	2,540	14.9*	9,440	15.8
40 or older	5,600	13.9	1,760	12.1*	7,360	13.4
Race[3]						
White	4,980	77.7	12,840	74.2*	47,820	76.7
Black or African American	4,960	12.1	2,290	13.5	7,250	12.5
Asian	2,540	5.3	1,540	8.6*	4,080	6.3
American Indian or Alaska Native	280	0.7	180	1.2*	460	0.9
Native Hawaiian or other Pacific Islander	140	0.4	150	1.0*	290	0.5
Multiple races	1,600	3.8	280	1.6*	1,880	3.2
Ethnicity[3]						
Not Hispanic	40,010	89.1	14,960	87.0*	54,960	88.5
Hispanic	4,490	10.9	2,320	13.0*	6,810	11.5
Sex[3]						
Male	18,230	42.2	7,800	46.9*	26,030	43.6
Female	26,260	57.8	9,480	53.1*	35,740	56.4
Institution level[4]						
4-year	33,690	57.9	11,770	51.1*	45,460	55.9
2-year	7,450	39.8	3,720	46.2*	11,170	41.7
Less-than-2-year	3,360	2.3	1,790	2.8	5,140	2.4
Institutional control[4]						
Public	28,060	75.9	10,610	77.2	38,680	76.3
Private not-for-profit	12,540	19.6	4,580	17.7*	17,110	19.0
Private for-profit	3,890	4.5	2,090	5.1	5,980	4.7
Institutional region[4]						
New England	2,540	5.2	1,040	5.4	3,580	5.2
Mid East	7,330	15.2	2,730	14.3	10,060	14.9
Great Lakes	7,360	15.8	2,640	14.7	10,000	15.5
Plains	3,520	7.2	1,150	6.0*	4,660	6.9
Southeast	10,010	23.0	3,440	19.4*	13,450	21.9
Southwest	4,650	11.1	2,140	13.7*	6,780	11.9
Rocky Mountain	1,850	3.9	610	3.7	2,460	3.9
Far West	6,440	17.4	3,080	21.1*	9,520	18.5
Outlying area	800	1.3	460	1.7	1,260	1.4

See footnotes at end of table.

Table 1.—Comparison of NPSAS:2000 CATI respondents and nonrespondents for all students—*Continued*

Variable	CATI respondents		CATI nonrespondents		Full sample	
	Sample size	Percent estimate[1]	Sample size	Percent estimate[1]	Sample size	Percent estimate[1]
Student type[4] (sampled)	11,340	6.9	3,700	5.7*	15,040	6.5
Baccalaureate recipient	24,620	78.8	10,890	83.3*	35,510	80.1
Other undergraduate student	7,610	12.4	2,400	9.5*	10,010	11.6
Graduate student	920	1.9	280	1.5*	1,200	1.8
First-professional student						
Student type[3] (CADE)	35,540	85.2	14,400	88.5*	49,930	86.2
Undergraduate student	8,040	13.0	2,600	10.1*	10,640	12.2
Graduate student	920	1.8	280	1.4*	1,200	1.7
First-professional student						
Fall enrollment status[3]	7,020	18.2	3,520	22.7*	10,540	19.5
Not enrolled	27,730	53.7	8,990	42.7*	36,720	50.5
Full-time	5,710	15.8	2,820	18.8*	8,530	16.7
Half-time	4,040	12.3	1,950	15.9*	5,980	13.3
Less than half-time						
Number of phone numbers obtained[5]	150	0.3	860	4.7*	1,010	1.6
0	21,080	52.4	7,960	50.1*	29,030	51.7
1	13,810	29.2	4,770	26.4*	18,580	28.4
2	9,460	18.1	3,690	18.8	13,150	18.3
3 or more						
Receipt of any aid[3]	18,240	48.4	8,320	56.5*	26,560	50.8
No	26,250	51.6	8,950	43.5*	35,200	49.3
Yes						
Receipt of federal aid[3]	24,140	60.4	10,320	66.9*	34,460	62.3
No	20,350	39.6	6,960	33.1*	27,300	37.7
Yes						
Receipt of state aid[3]	37,920	85.2	15,230	87.8*	53,140	85.9
No	6,580	14.8	2,050	12.2*	8,630	14.1
Yes						
Receipt of institution aid[3]	34,040	82.8	14,070	86.8*	48,110	84.0
No	10,450	17.2	3,210	13.2*	13,660	16.0
Yes						
Applied for federal aid[6]						
No	21,000	51.9	9,270	59.1*	30,270	54.0
Yes	23,500	48.2	8,010	40.9*	31,500	46.0

See footnotes at end of table.

Table 1.—Comparison of NPSAS:2000 CATI respondents and nonrespondents for all students—*Continued*

Variable	CATI respondents		CATI nonrespondents		Full sample	
	Sample size	Percent estimate[1]	Sample size	Percent estimate[1]	Sample size	Percent estimate[1]
Receipt of Pell grant[7]						
No	34,760	79.9	13,460	81.7*	48,220	80.4
Yes	9,730	20.1	3,820	18.3*	13,550	19.6
Pell grant amount received[7]						
Less than or equal to $1,183	2,480	29.5	910	28.9	3,390	29.3
$1,184 to $1,953	2,400	23.2	1,020	24.5	3,420	23.6
Greater than $1,953	4,860	47.3	1,880	46.6	6,740	47.1
Receipt of Stafford loan[7]						
No	28,310	70.5	12,050	76.3*	40,360	72.2
Yes	16,180	29.5	5,230	23.7*	21,410	27.8
Stafford loan amount received[7]						
Undergraduate students						
Less than or equal to $2,625	3,710	32.7	1,340	33.1	5,060	32.8
$2,626 to $4,425	3,000	22.4	1,020	23.2	4,020	22.6
$4,426 to $5,500	3,860	22.2	1,080	20.0*	4,940	21.7
Greater than $5,500	3,080	22.8	1,060	23.7	4,140	23.0
Graduate/first-professional students						
Less than or equal to $8,000	640	23.4	190	23.4	830	23.4
$8,001 to $12,521	620	23.3	180	23.7	800	23.4
$12,522 to $18,500	950	39.9	260	37.5	1,210	39.4
Greater than $18,500	320	13.4	110	15.5	430	13.9

[1]Using the final study weights and imputed data.

[2]Primary data sources are CADE and CPS.

[3]Primary data source is CADE.

[4]Primary data source is sampling frame.

[5]Primary data source is CATI control system. The CATI respondents with "zero phone numbers obtained" had called-in to the telephone center to complete the interview, or completed a self-administered paper version.

[6]Primary data source is CPS.

[7]Primary data source is NSLDS.

*Difference between CATI respondents and nonrespondents is significant at the 0.05/(c-1) level, where c is the number of categories within the primary variable.

NOTE: Some percentages may not sum to 100 percent for a variable due to rounding. To protect confidentiality of the data some numbers have been rounded.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

Table 2.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for all students

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonresponde nt mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Student's age		44,430	17,000	27.4	27.0	0.1140*	27.3	27.2	0.0319
Student age groups	19 or younger	6,470	2,510	19.5	18.9	0.2000	19.4	19.3	0.0650
	20 to 23	16,120	6,160	31.2	32.0	-0.2000	31.3	31.5	-0.1470
	24 to 29	9,360	4,100	19.3	22.0	-0.8000*	20.1	20.1	0.0260
	30 to 39	6,890	2,500	16.1	14.9	0.4000*	15.6	15.8	-0.1820
	40 or older	5,590	1,730	13.9	12.2	0.5000*	13.6	13.4	0.2370
Has student received any type of aid?	Yes	26,250	8,950	51.6	43.5	2.3000*	49.3	49.3	0.0060
	No	18,240	8,320	48.4	56.5	-2.3000*	50.8	50.8	-0.0060
Did student attend institution in the fall?	Yes, full time	27,610	8,640	53.7	42.0	3.3000*	50.4	50.5	-0.0740
	Yes, half time	5,670	2,720	15.8	18.8	-0.8000	16.6	16.7	-0.0560
	Yes, less than half time	4,000	1,900	12.2	16.0	-1.1000*	13.3	13.3	-0.0290
	No	7,020	3,520	18.3	23.2	-1.4000*	19.7	19.5	0.1590
Attendance	Full time	‡	‡	‡	‡	‡	36.9	37.4	-0.4720[1]
	Half time	‡	‡	‡	‡	‡	16.5	16.5	0.0050
	Less than half time	‡	‡	‡	‡	‡	21.1	21.3	-0.2740
	Mixed	‡	‡	‡	‡	‡	25.5	24.8	0.7410*
Citizenship status	U.S. citizen	39,660	14,550	93.0	90.3	0.8000	92.2	92.1	0.0860
	Resident	1,680	880	4.4	5.1	-0.2000	4.6	4.6	-0.0120
	Visa	1,490	1,100	2.6	4.6	-0.6000*	3.2	3.3	-0.0740
CPS match	Yes	23,500	8,010	48.2	40.9	2.1000*	46.1	46.0	0.0560
	No	21,000	9,270	51.9	59.1	-2.1000*	53.9	54.0	-0.0560
Dependency status – two-level	Dependent	‡	‡	‡	‡	‡	44.3	42.8	1.5170*[1]
	Independent	‡	‡	‡	‡	‡	55.7	57.2	-1.5170*

See footnotes at end of table.

Table 2.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for all students—Continued

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonresponde nt mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Dependency status – three-level	Dependent	‡	‡	‡	‡	‡	44.3	42.8	1.5170*[1]
	Independent w/out dependents	‡	‡	‡	‡	‡	27.2	29.4	-2.2180*
	Independent w/dependents	‡	‡	‡	‡	‡	28.5	27.8	0.7010*
Enrollment total at the student's institution enrollment categories[3]		44,490	17,280	16423.5	17296.3	-253.1520*	16673.9	16676.7	-2.7413
	Enrollment<=3,267	10,690	4,250	17.2	15.3	0.5000*	16.6	16.6	-0.0530
	3,267<enrollment<=11,096	11,570	4,180	28.1	26.6	0.5000	27.9	27.7	0.1890
	11,096<enrollment<24,120	11,060	4,490	28.8	30.4	-0.4600	29.1	29.3	-0.1320
	24,120<=enrollment	11,170	4,350	25.9	27.8	-0.5300*	26.5	26.5	-0.0040
Was the student enrolled in institution in the fall?	Yes, at a NPSAS institution	36,410	13,520	79.7	76.2	1.0270*	78.6	78.7	-0.1110
	Yes, not at a NPSAS institution	1,060	240	2.1	1.1	0.2820*	1.8	1.8	-0.0480
	No	7,020	3,520	18.2	22.7	-1.3100*	19.7	19.5	0.1590
Did the student receive any federal financial aid?	Yes	20,350	6,960	39.6	33.1	1.8930*	37.8	37.7	0.0280
	No	24,140	10,320	60.4	66.9	-1.8930*	62.2	62.3	-0.0280
Student's sex	Male	17,870	7,750	42.2	46.9	-1.3980*	43.5	43.6	-0.0310
	Female	25,780	9,420	57.8	53.1	1.3980*	56.5	56.4	0.0310
Did the student receive any Institution financial aid?	Yes	10,450	3,210	17.2	13.2	1.1610*	16.0	16.0	0.0200
	No	34,040	14,070	82.8	86.8	-1.1610*	84.0	84.0	-0.0200
Institution region	New England	2,540	1,040	5.2	5.4	-0.0520	5.3	5.2	0.0470
	Mid East	7,330	2,730	15.2	14.3	0.2610	14.9	14.9	-0.0030
	Great Lakes	7,360	2,640	15.8	14.7	0.2900	15.7	15.5	0.2500
	Plains	3,520	1,150	7.2	6.0	0.3500*	7.0	6.9	0.1590
	Southeast	10,010	3,440	23.0	19.4	1.0300*	22.1	21.9	0.1080
	Southwest	4,650	2,140	11.1	13.7	-0.7500*	11.9	11.9	0.0410
	Rocky Mountain	1,850	610	3.9	3.7	0.0600	3.9	3.9	0.0040
	Far West	6,440	3,080	17.4	21.1	-1.0700*	17.8	18.5	-0.6260*
	Outlying area	800	460	1.3	1.7	-0.1100	1.5	1.4	0.0190

See footnotes at end of table.

Table 2.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for all students—Continued

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonresponde nt mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Did the student receive any Pell grants?	Yes	9,730	3,820	20.1	18.3	0.5400*	19.6	19.6	0.0000
	No	34,760	13,460	79.9	81.7	-0.5400*	80.4	80.4	0.0000
Pell categories for all Pell recipients	Pell amount <= $1,183	2,480	910	29.5	28.9	0.1500	29.5	29.3	0.1880
	$1,183 < Pell amount <= $1,953	2,400	1,020	23.2	24.5	-0.3400	23.2	23.6	-0.3300
	$1,953 < Pell amount	4,860	1,880	47.3	46.6	0.1900*	47.2	47.1	0.1410
What was the amount of the Pell grant received?		9,730	3,820	1911.2	1909.3	0.5098	1910.7	1910.7	0.0000
Institution sector	Public less-than-2-year	740	320	0.6	0.6	0.0000	0.6	0.6	0.0000
	Public 2-year	5,950	2,980	37.6	43.8	-1.8000*	39.4	39.4	0.0000
	Public 4-year non-doctorate-granting	6,730	2,230	12.7	10.4	0.6800*	12.0	12.0	0.0000
	Public 4-year doctorate-granting	14,640	5,090	25.0	22.4	0.7500*	24.3	24.3	0.0000
	Private not-for-profit 2-year or less	980	530	0.7	0.8	-0.0400	0.7	0.7	0.0000
	Private not-for-profit 4-year non-doctorate-granting	5,410	1,780	9.4	8.2	0.3600*	9.1	9.1	0.0000
	Private not-for-profit 4-year doctorate-granting	6,150	2,260	9.5	8.7	0.2400	9.3	9.3	0.0000
	Private for-profit less-than-2-year	2,350	1,290	1.6	2.0	-0.1000	1.7	1.7	0.0000
	Private for-profit 2-year	780	390	1.6	1.7	-0.0300	1.7	1.7	0.0000
	Private for-profit 4-year	760	410	1.2	1.4	-0.0600	1.3	1.3	0.0000
Student's marital status	Single	‡	‡	‡	‡	‡	73.0	74.0	-1.0010*[1]
	Married	‡	‡	‡	‡	‡	25.7	24.6	1.0590*
	Separated	‡	‡	‡	‡	‡	1.3	1.4	-0.0580
Stafford categories for all	UG and Stafford amount <= $2,625	3,710	1,340	27.8	28.7	-0.2200	28.2	28.0	0.1970

See footnotes at end of table.

Table 2.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for all students—Continued

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonresponde ut mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Stafford recipients[4]	UG and $2,625 < Stafford amount <= $4,425	3,000	1,020	19.0	20.1	-0.2700	19.1	19.3	-0.2630
	UG and $4,425 < Stafford amount <= $5,500	3,860	1,080	18.9	17.4	0.3800	18.8	18.5	0.2970
	UG and $5,500 < Stafford amount	3,080	1,060	19.4	20.6	-0.3000	19.6	19.7	-0.0500
	GR and Stafford amount <= $8,000	640	190	3.5	3.1	0.0900	3.3	3.4	-0.1320
	GR and $8,000< Stafford amount <= $12,521	620	180	3.5	3.1	0.0800	3.3	3.4	-0.1110
	GR and $12,521 < Stafford amount <= $18,500	950	260	5.9	5.0	0.2400	5.7	5.7	0.0330
	GR and $18,500 < Stafford amount	320	110	2.0	2.0	-0.0100	2.0	2.0	0.0300
Amount of Stafford loan received		16,180	5,230	6014.3	5839.6	43.1473	5990.5	5971.2	19.2861
Did the student receive a Stafford loan?	Yes	16,180	5,230	29.5	23.7	1.6900*	27.7	27.8	-0.0890
	No	28,310	12,050	70.5	76.3	-1.6900*	72.3	72.2	0.0890
Did the student receive any state financial aid?	Yes	6,580	2,050	14.8	12.2	0.7500*	14.1	14.1	0.0180
	No	37,920	15,230	85.2	87.8	-0.7500*	85.9	85.9	-0.0180
Student type – sampled	Baccalaureate recipient	11,340	3,700	6.9	5.7	0.3400*	6.4	6.5	-0.1510*[2]
	Other undergraduate student	24,620	10,890	78.8	83.3	-1.3000*	80.2	80.1	0.0830
	Graduate student	7,610	2,400	12.4	9.5	0.8300*	11.7	11.6	0.1120
	First-professional student	920	280	1.9	1.5	0.1200*	1.7	1.8	-0.0430
Student type – CADE	Undergraduate student	35,540	14,400	85.2	88.5	-0.9700*	86.2	86.2	0.0000
	Graduate student	8,040	2,600	13.0	10.1	0.8400*	12.2	12.2	0.0000
	First-professional student	920	280	1.8	1.4	0.1400*	1.7	1.7	0.0000

*Bias is significant at the 0.05/(c-1) level, where c is the number of categories within the primary variable.

‡Sufficient data from other non-CATI sources were not available prior to imputation.

[1]The distribution based on the CATI weights is significantly different from the distribution based on the study weights at the 0.05 level, and there were not sufficient data available from other non-CATI sources to include the variable in the nonresponse models.

[2]The distribution based on the CATI weights is significantly different from the distribution based on the study weights at the 0.05 level. Sampled student type was not included in the nonresponse models because it is not an actual student characteristic and may not reflect true student type.

[3]Enrollment categories were defined by quartiles based on total enrollment for the 1997-1998 school year.

[4]UG = undergraduate student, GR = graduate student, and FP = first-professional student.

NOTE: Estimated bias before CATI nonresponse adjustment is the difference between the mean for CATI respondents and nonrespondents multiplied by the weighted nonresponse rate. After weight adjustments, estimated bias is the difference between means based on the CATI weights and the study weights. To protect confidentiality of the data, some numbers have been rounded.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

Table 3.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for students sampled as baccalaureate recipients

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonrespondent mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Student's age		11,340	3,650	25.9	25.1	0.1850*	25.8	25.7	0.0800*
Student age groups	19 or younger	40	20	0.4	0.6	-0.1000	0.4	0.4	-0.0580[1]
	20 to 23	6,920	2,150	60.2	58.5	0.4000	60.2	59.8	0.3340
	24 to 29	2,320	970	20.8	26.8	-1.5000*	21.7	22.2	-0.5210
	30 to 39	1,150	320	10.3	9.0	0.3000	9.8	10.0	-0.1890
	40 or older	920	180	8.4	5.1	0.8000*	8.0	7.6	0.4330*
Has student received any type of aid?	Yes	7,260	2,090	63.2	56.5	1.7000*	61.1	61.5	-0.3940
	No	4,080	1,610	36.8	43.5	-1.7000*	38.9	38.5	0.3940
Did student attend institution in the fall?	Yes, full time	8,720	2,490	76.4	69.3	1.8000*	73.8	74.6	-0.8200
	Yes, half time	1,090	470	10.0	13.0	-0.7000*	11.1	10.8	0.2930
	Yes, less than half time	450	180	4.0	4.9	-0.2000	4.4	4.3	0.1440
	No	1,060	470	9.6	12.9	-0.8000*	10.7	10.4	0.3830
Attendance	Full time	‡	‡	‡	‡	‡	49.8	50.7	-0.8340[2]
	Half time	‡	‡	‡	‡	‡	11.8	11.1	0.7330*
	Less than half time	‡	‡	‡	‡	‡	7.0	7.0	0.0370
	Mixed	‡	‡	‡	‡	‡	31.4	31.3	0.0630
Citizenship status	U.S. citizen	10,550	3,230	94.4	89.8	1.2000*	93.8	93.3	0.5630*[1]
	Resident	320	130	3.4	4.2	-0.2000	3.4	3.6	-0.1220
	Visa	210	230	2.2	6.0	-1.0000*	2.7	3.2	-0.4400*
CPS match	Yes	6,400	1,780	55.3	48.5	1.7000*	53.3	53.6	-0.2670
	No	4,940	1,920	44.7	51.5	-1.7000*	46.7	46.4	0.2670
Dependency status – two-level	Dependent	‡	‡	‡	‡	‡	55.3	53.5	1.7820*[2]
	Independent	‡	‡	‡	‡	‡	44.7	46.5	-1.7820*
Dependency status – three-level	Dependent	‡	‡	‡	‡	‡	55.3	53.5	1.7820*[2]
	Independent w/out dependents	‡	‡	‡	‡	‡	27.4	28.7	-1.2950*
	Independent w/dependents	‡	‡	‡	‡	‡	17.3	17.8	-0.4880
Enrollment total at the student's institution		11,340	3,700	16883.0	18442.3	-394.6140*	17157.3	17277.6	-120.3227
Enrollment categories[3]	Enrollment<=3,267	1,960	520	16.8	12.9	1.0000*	16.0	15.8	0.2120
	3,267<enrollment<=11,096	3,320	980	27.8	25.0	0.7000	27.7	27.1	0.5720
	11,096<enrollment<24,120	2,850	1,040	25.7	29.0	-0.8410*	25.9	26.5	-0.6300
	24,120<=enrollment	3,210	1,150	29.8	33.1	-0.8460*	30.4	30.6	-0.1540
Was the student enrolled in institution in the fall?	Yes, at a NPSAS institution	10,210	3,220	90.0	87.2	0.7260*	88.9	89.3	-0.3710
	Yes, not at a NPSAS institution	80	10	0.4	0.2	0.0390	0.3	0.3	-0.0120
	No	1,060	470	9.6	12.6	-0.7650*	10.7	10.4	0.3830
Did the student receive any federal financial aid?	Yes	5,800	1,660	50.6	45.9	1.1890*	49.0	49.4	-0.4500
	No	5,550	2,040	49.4	54.1	-1.1890*	51.1	50.6	0.4500
Student's sex	Male	4,290	1,610	40.6	45.6	-1.2690*	41.6	41.8	-0.2450
	Female	6,920	2,080	59.4	54.4	1.2690*	58.5	58.2	0.2450

See footnotes at end of table.

Table 3.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for students sampled as baccalaureate recipients —*Continued*

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonrespondent mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Did the student receive any institution financial aid?	Yes	3,540	990	30.1	26.2	1.0020*	28.8	29.1	-0.3210
	No	7,810	2,710	69.9	73.8	-1.0020*	71.2	70.9	0.3210
Institution region	New England	680	280	6.4	7.3	-0.2430	6.6	6.6	0.0290
	Mid East	2,000	680	17.7	17.9	-0.0660	17.4	17.7	-0.3360
	Great Lakes	2,020	600	17.2	15.9	0.3200	17.2	16.8	0.3720
	Plains	960	240	8.8	6.9	0.4730	8.6	8.3	0.3000
	Southeast	2,670	830	22.3	21.3	0.2450	21.7	22.1	-0.3330
	Southwest	1,140	420	9.8	12.0	-0.5440*	10.4	10.4	0.0620
	Rocky Mountain	440	100	3.7	2.6	0.2760	3.6	3.4	0.2140
	Far West	1,320	480	13.4	14.9	-0.3920	13.5	13.8	-0.3220
	Outlying area	120	60	0.9	1.2	-0.0690	1.0	1.0	0.0140
Did the student receive any Pell grants?	Yes	2,590	790	21.2	20.5	0.1650	20.6	21.0	-0.4420
	No	8,750	2,910	78.8	79.5	-0.1650	79.4	79.0	0.4420
Pell categories for all Pell recipients	Pell amount <= $1,138	670	180	28.6	26.0	0.6370	28.2	27.9	0.3160
	$1,138 < Pell amount <= $1,775	670	200	25.7	27.0	-0.3230	25.3	26.1	-0.7370
	$1,775 < Pell amount<=$2,975	630	190	23.8	24.2	-0.1000	24.2	23.9	0.3410
	$2,975 < Pell amount	630	210	21.9	22.8	-0.2130	22.2	22.1	0.0800
What was the amount of the Pell grant received?		2,590	790	1820.7	1853.8	-8.1684	1832.9	1828.9	3.9669
Institution sector	Public less-than-2-year	0	0	0.0	0.0	0.0000	0.0	0.0	0.0000
	Public 2-year	0	0	0.0	0.0	0.0000	0.0	0.0	0.0000
	Public 4-year non-doctorate-granting	2,480	680	21.4	16.1	1.3590*	20.9	20.1	0.7780*
	Public 4-year doctorate-granting	4,900	1,680	43.9	48.8	-1.2300*	44.5	45.1	-0.6490
	Private not-for-profit 2-year or less	0	0	0.0	0.0	0.0000	0.0	0.0	0.0000
	Private not-for-profit 4-year non-doctorate-granting	2,140	580	20.3	17.7	0.6480	19.8	19.6	0.1620
	Private not-for-profit 4-year doctorate-granting	1,690	670	13.3	15.5	-0.5420	13.7	13.9	-0.1890
	Private for-profit less-than-2-year	0	0	0.0	0.0	0.0000	0.0	0.0	0.0000
	Private for-profit 2-year	0	0	0.0	0.0	0.0000	0.0	0.0	0.0000
	Private for-profit 4-year	140	90	1.1	2.0	-0.2350*	1.2	1.3	-0.1020
Student's marital status	Single	‡	‡	‡	‡	‡	80.5	81.1	-0.5730*
	Married	‡	‡	‡	‡	‡	18.7	18.1	0.5620*
	Separated	‡	‡	‡	‡	‡	0.8	0.8	0.0110
Stafford categories for	Stafford amount <= $3,500	1,270	380	23.9	26.6	-0.6330	23.7	24.6	-0.8400
Stafford recipients	$3,500 < Stafford amount <= $5,500	2,610	700	52.1	49.2	0.6700	52.1	51.4	0.6720
	$5,500 < Stafford amount	1,170	360	24.0	24.2	-0.0380	24.2	24.1	0.1680
Amount of Stafford loan received		5,050	1,450	5696.0	5695.2	0.1816	5715.6	5695.8	19.7161
Did the student receive a Stafford loan?	Yes	5,050	1,450	44.6	40.5	1.0400*	43.1	43.5	-0.4370
	No	6,290	2,250	55.4	59.5	-1.0400*	56.9	56.5	0.4370

See footnotes at end of table.

Table 3.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for students sampled as baccalaureate recipients —*Continued*

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonrespondent mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Did the student receive any state financial aid?	Yes	2,260	590	19.1	15.8	0.8490*	18.3	18.3	-0.0110
	No	9,090	3,120	80.9	84.2	-0.8490*	81.7	81.7	0.0110
Student type – CADE	Undergraduate student	10,900	3,520	96.2	94.9	0.3210*	96.2	95.9	0.3240*
	Graduate student	410	160	3.5	4.5	-0.2560	3.5	3.8	-0.2580
	First-professional student	40	20	0.3	0.6	-0.0650	0.3	0.4	-0.0660

* Bias is significant at the 0.05/(c-1) level, where c is the number of categories within the primary variable.

‡Sufficient data from other non-CATI sources were not available prior to imputation.

[1]The distribution based on the CATI weights is significantly different from the distribution based on the study weights at the 0.05 level. The interaction term of this variable crossed with student type was not included in the nonresponse models because the weighting was done at the all-student level and not separately by student type.

[2]The distribution based on the CATI weights is significantly different from the distribution based on the study weights at the 0.05 level, and there were not sufficient data available from other non-CATI sources to include the variable in the nonresponse models.

[3]Enrollment categories were defined by quartiles based on total enrollment for the 1997-1998 school year.

NOTE: Estimated bias before CATI nonresponse adjustment is the difference between the mean for CATI respondents and nonrespondents multiplied by the weighted nonresponse rate. After weight adjustments, estimated bias is the difference between means based on the CATI weights and the study weights. To protect confidentiality of the data, some numbers have been rounded.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

Table 4.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for undergraduate students

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonrespondent mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Student's age		35,490	14,220	26.4	26.3	0.0180	26.4	26.4	0.0346
Student age groups	19 or younger	6,430	2,500	22.7	21.3	0.4000	22.4	22.3	0.0520
	20 to 23	15,310	5,880	34.9	34.7	0.0000	34.7	34.9	-0.1610
	24 to 29	5,980	2,940	16.1	19.3	-0.9000*	17.0	17.0	-0.0180
	30 to 39	4,340	1,710	14.1	13.5	0.2000	13.8	13.9	-0.1310
	40 or older	3,440	1,180	12.2	11.2	0.3000	12.2	11.9	0.2570
Has student received any type of aid?	Yes	21,920	7,650	52.7	43.6	2.7000*	50.1	50.0	0.1250
	No	13,610	6,750	47.3	56.4	-2.7000*	49.9	50.0	-0.1250
Did student attend institution in the fall?	Yes, full time	23,190	7,620	55.4	43.2	3.6000*	51.8	52.0	-0.1510
	Yes, half time	4,170	2,020	15.4	18.0	-0.7000*	16.2	16.2	0.0320
	Yes, less than half time	2,410	1,320	11.0	15.4	-1.3000*	12.2	12.3	-0.0660
	No	5,610	3,020	18.2	23.5	-1.6000*	19.8	19.6	0.1850
Attendance	Full time	‡	‡	‡	‡	‡	38.5	38.9	-0.3940[1]
	Half time	‡	‡	‡	‡	‡	16.1	16.1	-0.0520
	Less than half time	‡	‡	‡	‡	‡	19.9	20.3	-0.3920
	Mixed	‡	‡	‡	‡	‡	25.5	24.7	0.8380*
Citizenship status	U.S. citizen	32,410	12,500	93.7	91.5	0.7000*	93.0	93.0	-0.0180
	Resident	1,440	750	4.6	5.2	-0.2000	4.8	4.8	0.0420
	Visa	590	600	1.7	3.3	-0.5000*	2.2	2.2	-0.0250
CPS match	Yes	20,600	7,190	50.7	42.2	2.5000*	48.3	48.2	0.1550
	No	14,940	7,210	49.3	57.8	-2.5000*	51.7	51.8	-0.1550
Dependency status – two-level	Dependent	‡	‡	‡	‡	‡	50.7	49.1	1.5600*[1]
	Independent	‡	‡	‡	‡	‡	49.3	50.9	-1.5600*
Dependency status – three-level	Dependent	‡	‡	‡	‡	‡	50.7	49.1	1.5600*[1]
	Independent w/out dependents	‡	‡	‡	‡	‡	21.9	24.0	-2.0810*
	Independent w/dependents	‡	‡	‡	‡	‡	27.4	26.9	0.5210*
Enrollment total at the student's institution		35,540	14,400	16207.4	17129.2	-274.7700*	16499.4	16482.2	17.2492
Enrollment categories[3]	Enrollment<=3,267	9,280	3,860	17.7	15.7	0.6000*	17.1	17.1	-0.0270
	3,267<enrollment<=11,096	9,410	3,540	28.6	27.0	0.5000	28.2	28.1	0.1040
	11,096<enrollment<24,120	8,560	3,640	28.5	30.3	-0.5334	28.9	29.1	-0.1690
	24,120<=enrollment	8,280	3,350	25.2	27.0	-0.5507	25.8	25.7	0.0920
Was the student enrolled in institution in the fall?	Yes, at a NPSAS institution	28,960	11,150	79.6	75.8	1.1298*	78.3	78.4	-0.1250
	Yes, not at a NPSAS institution	970	230	2.3	1.2	0.3236*	1.9	2.0	-0.0600
	No	5,610	3,020	18.1	23.0	-1.4534*	19.8	19.6	0.1850
Did the student receive any federal financial aid?	Yes	17,740	6,210	41.3	33.8	2.2195*	39.1	39.0	0.0970
	No	17,800	8,190	58.8	66.2	-2.2195*	60.9	61.0	-0.0970
Student's sex	Male	14,080	6,430	42.2	47.4	-1.5688*	43.6	43.7	-0.1010
	Female	20,870	7,890	57.8	52.6	1.5688*	56.4	56.3	0.1010

See footnotes at end of table.

Table 4.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for undergraduate students —*Continued*

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonrespondent mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Did the student receive any institution financial aid?	Yes	8,030	2,450	16.3	12.1	1.2542*	15.2	15.0	0.1100
	No	27,510	11,950	83.7	87.9	-1.2542*	84.9	85.0	-0.1100
Institution region	New England	1,920	800	5.0	5.1	-0.0423	5.1	5.0	0.0630
	Mid East	5,670	2,150	14.5	13.5	0.2972	14.2	14.2	-0.0070
	Great Lakes	5,850	2,150	15.4	14.3	0.3300	15.4	15.1	0.2820
	Plains	2,770	940	7.0	5.9	0.3500*	6.8	6.7	0.1480
	Southeast	8,200	2,930	23.4	19.6	1.1300*	22.4	22.3	0.1630
	Southwest	3,740	1,810	11.3	14.0	-0.7900*	12.1	12.1	0.0270
	Rocky Mountain	1,560	560	4.1	3.9	0.0300	4.0	4.0	-0.0250
	Far West	5,100	2,640	17.9	21.9	-1.1900*	18.4	19.1	-0.6670
	Outlying area	740	420	1.4	1.8	-0.1200	1.6	1.5	0.0170
Did the student receive any Pell grants?	Yes	9,690	3,800	23.5	20.6	0.8700*	22.6	22.6	-0.0010
	No	25,850	10,600	76.5	79.4	-0.8700*	77.4	77.4	0.0010
Pell categories for all Pell recipients	Pell amount <= $1,183	2,460	910	29.5	28.9	0.1700	29.6	29.4	0.2060
	$1,183 < Pell amount <= $1,953	2,390	1,010	23.2	24.4	-0.3200	23.3	23.6	-0.3150
	$1,953 < Pell amount	4,840	1,880	47.2	46.7	0.1500	47.2	47.1	0.1100
What was the amount of the Pell grant received?		9,690	3,800	1910.4	1910.5	-0.0083	1909.9	1910.4	-0.5048
Institution sector	Public less-than-2-year	740	320	0.7	0.7	0.0000	0.7	0.7	0.0000
	Public 2-year	5,900	2,980	43.8	49.5	-1.7000*	45.4	45.5	-0.0830
	Public 4-year non-doctorate-granting	5,780	1,950	12.8	10.3	0.7500*	12.1	12.1	0.0040
	Public 4-year doctorate-granting	10,520	3,780	21.7	19.5	0.6500*	21.1	21.1	0.0540
	Private not-for-profit 2-year or less	970	530	0.8	0.9	-0.0400	0.8	0.8	-0.0010
	Private not-for-profit 4-year non-doctorate-granting	4,710	1,560	9.4	8.0	0.4400*	9.0	9.0	-0.0090
	Private not-for-profit 4-year doctorate-granting	3,260	1,280	5.9	5.6	0.0900	5.8	5.8	0.0280
	Private for-profit less-than-2-year	2,340	1,290	1.9	2.2	-0.1000	2.0	2.0	0.0000
	Private for-profit 2-year	780	390	1.9	2.0	-0.0100	1.9	1.9	0.0000
	Private for-profit 4-year	530	320	1.1	1.3	-0.0700	1.2	1.2	0.0080
Student's marital status	Single	‡	‡	‡	‡	‡	76.1	76.9	-0.7700*[1]
	Married	‡	‡	‡	‡	‡	22.5	21.6	0.8460*
	Separated	‡	‡	‡	‡	‡	1.4	1.5	-0.0770
Stafford categories for Stafford recipients	Stafford amount <= $2,625	3,710	1,340	32.7	33.1	-0.1000	32.9	32.8	0.1610
	$2,625 < Stafford amount <= $4,425	3,000	1,020	22.4	23.2	-0.2100	22.2	22.6	-0.3550
	$4,425 < Stafford amount <= $5,500	3,860	1,080	22.2	20.0	0.5500*	22.0	21.7	0.3010
	$5,500 < Stafford amount	3,080	1,060	22.8	23.7	-0.2400	22.9	23.0	-0.1070

See footnotes at end of table.

Table 4.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for undergraduate students —*Continued*

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonrespondent mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Amount of Stafford loan received									
Did the student receive a	Yes	13,650	4,500	4606.3	4547.1	14.8243	4599.6	4591.5	8.1385
Stafford loan?	No	13,650	4,500	29.5	23.2	1.8700*	27.6	27.6	-0.0310
Did the student receive any state	Yes	21,890	9,900	70.5	76.8	-1.8700*	72.4	72.4	0.0310
financial aid?	No	6,310	1,960	16.9	13.4	1.0200*	15.9	15.9	0.0380
Student type – sampled	Baccalaureate recipient	29,220	12,440	83.1	86.6	-1.0200*	84.1	84.2	-0.0380
	Other undergraduate student	10,900	3,520	7.8	6.1	0.4900*	7.1	7.3	-0.1440[2]
	Graduate student	24,280	10,830	91.3	93.7	-0.6900*	92.0	92.0	-0.0340
	First-professional student	330	40	0.8	0.2	0.1900*	0.8	0.7	0.1800*
		30	10	0.1	0.1	0.0000	0.1	0.1	-0.0020

* Bias is significant at the 0.05/(c-1) level, where c is the number of categories within the primary variable.

‡Sufficient data from other non-CATI sources were not available prior to imputation.

[1]The distribution based on the CATI weights is significantly different from the distribution based on the study weights at the 0.05 level, and there were not sufficient data available from other non-CATI sources to include the variable in the nonresponse models.

[2]The distribution based on the CATI weights is significantly different from the distribution based on the study weights at the 0.05 level. Sampled student type was not included in the nonresponse models because it is not an actual student characteristic and may not reflect true student type.

[3]Enrollment categories were defined by quartiles based on total enrollment for the 1997-1998 school year.

NOTE: Estimated bias before CATI nonresponse adjustment is the difference between the mean for CATI respondents and nonrespondents multiplied by the weighted nonresponse rate. After weight adjustments, estimated bias is the difference between means based on the CATI weights and the study weights. To protect confidentiality of the data, some numbers have been rounded.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

Table 5.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for graduate/first-professional students

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonrespondent mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Student's age									
Student age groups	19 or younger	8,940	2,780	32.9	31.9	0.2330*	32.7	32.6	0.0153
	20 to 23	40	10	0.8	0.2	0.1000*	0.8	0.7	0.1470*
	24 to 29	820	280	10.0	10.9	-0.2000	10.1	10.2	-0.0590
	30 to 39	3,380	1,150	38.1	43.5	-1.3000*	39.6	39.3	0.3000
	40 or older	2,550	790	27.7	25.6	0.5000	26.8	27.3	-0.5020
Has student received any type of aid?	Yes	2,150	550	23.4	19.8	0.8000*	22.7	22.6	0.1130
	No	4,330	1,300	45.4	42.6	0.7000*	44.0	44.7	-0.7360*[1]
Did student attend institution in the fall?	Yes, full time	4,630	1,580	54.6	57.5	-0.7000*	56.0	55.3	0.7360*
	Yes, half time	4,420	1,020	44.1	32.9	2.7000*	41.9	41.5	0.4030
	Yes, less than half time	1,500	700	18.0	24.9	-1.6000*	19.1	19.7	-0.6020
	No	1,590	580	19.2	21.4	-0.5000	20.0	19.8	0.2020
Attendance	Full time	1,410	500	18.6	20.8	-0.5000	19.0	19.0	-0.0020
	Half time	‡	‡	‡	‡	‡	26.8	27.8	-0.9650*[2]
	Less than half time	‡	‡	‡	‡	‡	19.2	18.8	0.3640
	Mixed	‡	‡	‡	‡	‡	28.3	27.8	0.4720
Citizenship status	U.S. citizen	‡	‡	‡	‡	‡	25.7	25.6	0.1290
	Resident	7,260	2,050	89.0	80.8	2.0000*	87.5	86.8	0.7310*[1]
	Visa	240	130	2.9	4.4	-0.3000*	2.9	3.2	-0.3510*
CPS match	Yes	900	500	8.0	14.8	-1.6000*	9.7	10.0	-0.3800
	No	2,900	820	33.5	30.5	0.7000*	32.2	32.8	-0.5600
Dependency status – two-level	Dependent	6,060	2,060	66.5	69.5	-0.7000*	67.8	67.2	0.5600
	Independent	‡	‡	‡	‡	‡	4.4	3.2	1.2470*[2]
Dependency status – three-level	Dependent	‡	‡	‡	‡	‡	95.6	96.9	-1.2470*
	Independent w/out dependents	‡	‡	‡	‡	‡	4.4	3.2	1.2470*[2]
	Independent w/dependents	‡	‡	‡	‡	‡	59.9	63.0	-3.0720*
Enrollment total at the student's institution		‡	‡	‡	‡	‡	35.7	33.9	1.8240*
Enrollment categories[3]	Enrollment<=3,267	8,960	2,880	17666.0	18587.8	-221.2910*	17760.1	17887.3	-127.1421
	3,267<enrollment<=11,096	1,410	390	14.1	12.5	0.4000	13.5	13.8	-0.2150
	11,096<enrollment<24,120	2,160	640	25.4	23.2	0.5000	25.6	24.9	0.7190*
	24,120<=enrollment	2,500	850	30.3	31.0	-0.1000	30.6	30.5	0.0980
Was the student enrolled in institution in the fall?	Yes, at a NPSAS institution	2,890	1,000	30.1	33.3	-0.8000*	30.3	30.9	-0.6020
	Yes, not at a NPSAS institution	7,450	2,370	80.6	79.3	0.3000	80.3	80.3	-0.0210
	No	100	10	0.9	0.3	0.1000*	0.7	0.7	0.0230
Did the student receive any federal financial aid?	Yes	1,410	500	18.5	20.4	-0.4000	19.0	19.0	-0.0020
	No	2,610	750	30.4	27.7	0.6000*	29.3	29.7	-0.4010
		6,340	2,130	69.6	72.3	-0.6000*	70.7	70.3	0.4010

See footnotes at end of table.

Table 5.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for graduate/first-professional students —*Continued*

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonrespondent mean, study weights	Estimated bias	Mean, CATI weights	Mean, study weights	Estimated bias
Student's sex	Male	3,780	1,310	42.2	43.5	-0.3000	43.0	42.6	0.4110
	Female	4,910	1,530	57.8	56.5	0.3000	57.0	57.4	-0.4110
Did the student receive any institution financial aid?	Yes	2,430	760	22.2	21.4	0.2000	21.4	22.0	-0.5370*[1]
	No	6,530	2,120	77.9	78.6	-0.2000	78.6	78.0	0.5370*
Institution region	New England	620	240	6.3	7.1	-0.2000	6.4	6.5	-0.0530
	Mid East	1,670	580	19.1	20.3	-0.3000	19.4	19.4	0.0260
	Great Lakes	1,520	490	17.5	17.9	-0.1000	17.7	17.6	0.0550
	Plains	740	210	8.4	7.1	0.3000	8.3	8.1	0.2250
	Southeast	1,810	510	20.5	18.1	0.6000	19.7	19.9	-0.2320
	Southwest	910	320	9.9	11.7	-0.4000	10.5	10.3	0.1300
	Rocky Mountain	290	50	3.2	2.1	0.3000*	3.1	2.9	0.1860
	Far West	1,330	440	14.4	14.9	-0.1000	14.2	14.5	-0.3690
	Outlying area	70	30	0.7	0.9	0.0000	0.8	0.8	0.0320
Institution sector	Public less-than-2-year	0	0	0.0	0.0	0.0000	0.0	0.0	0.0000[1]
	Public 2-year	60	0	2.2	0.1	0.5100*	2.3	1.7	0.5160*
	Public 4-year non-doctorate-granting	940	270	12.0	10.5	0.3600	11.6	11.7	-0.0230
	Public 4-year doctorate-granting	4,120	1,310	44.0	44.9	-0.2000	43.9	44.2	-0.3360
	Private not-for-profit 2-year or less	10	0	0.0	0.0	0.0100	0.0	0.0	0.0070
	Private not-for-profit 4-year non-doctorate-granting	700	220	9.2	9.7	-0.1200	9.4	9.4	0.0540
	Private not-for-profit 4-year doctorate-granting	2,890	980	30.5	32.6	-0.5100	30.8	31.0	-0.1720
	Private for-profit less-than-2-year	0	0	0.0	0.0	0.0000	0.0	0.0	0.0030
	Private for-profit 2-year	0	0	0.0	0.0	0.0000	0.0	0.0	0.0000
	Private for-profit 4-year	240	90	2.0	2.2	-0.0500	2.0	2.0	-0.0480
Student's marital status	Single	‡	‡	‡	‡	‡	53.6	56.0	-2.4390*[2]
	Married	‡	‡	‡	‡	‡	45.6	43.2	2.3830*
	Separated	‡	‡	‡	‡	‡	0.9	0.8	0.0570
Stafford categories for Stafford recipients	Stafford amount <= $8,000	640	190	23.4	23.4	0.0000	22.8	23.4	-0.6300
	$8,000< Stafford amount <= $12,521	620	180	23.3	23.7	-0.0900	22.9	23.4	-0.4840
	$12,521 < Stafford amount <= $18,500	950	260	39.9	37.5	0.5500	40.1	39.4	0.7290
	$18,500 < Stafford amount	320	110	13.4	15.5	-0.4600	14.3	13.9	0.3850

See footnotes at end of table.

Table 5.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for graduate/first-professional students —*Continued*

Description	Response	Before CATI nonresponse adjustment—unimputed data					After weight adjustments—imputed data		
		CATI unweighted respondents	CATI unweighted nonrespondents	CATI respondent mean, study weights	CATI nonrespondent mean, study weights	Estimated bias	Mean CATI weights	Mean, study weights	Estimated bias
Amount of Stafford loan received		2,540	730	14078.9	14316.2	-53.5906	14339.2	14132.5	206.7180*
Did the student receive a Stafford loan?	Yes	2,540	730	29.6	27.3	0.5400*	28.6	29.0	-0.4540
	No	6,420	2,150	70.4	72.7	-0.5400*	71.4	71.0	0.4540
Did the student receive any state financial aid?	Yes	260	90	3.1	3.0	0.0200	3.0	3.1	-0.1110
	No	8,690	2,790	96.9	97.0	-0.0200	97.0	96.9	0.1110
Student type – sampled	Baccalaureate recipient	440	180	1.8	2.5	-0.1800*	1.8	2.0	-0.1950*
	Other undergraduate student	340	60	7.0	3.3	0.8700*	6.9	6.1	0.8100*
	Graduate student	7,280	2,360	78.8	81.6	-0.6700*	79.1	79.5	-0.3130
	First-professional student	890	280	12.5	12.6	-0.0200	12.2	12.5	-0.3020
Student type – CADE	Undergraduate student	0	0	0.0	0.0	0.0000	0.0	0.0	0.0000
	Graduate student	8,040	2,600	87.6	88.2	-0.1400	87.8	87.8	0.0000
	First-professional student	920	280	12.4	11.8	0.1400	12.2	12.2	0.0000

* Bias is significant at the 0.05/(c-1) level, where c is the number of categories within the primary variable.

‡Sufficient data from other non-CATI sources were not available prior to imputation.

[1]The distribution based on the CATI weights is significantly different from the distribution based on the study weights at the 0.05 level. The interaction term of this variable crossed with student type was not included in the nonresponse models because the weighting was done at the all-student level and not separately by student type.

[2]The distribution based on the CATI weights is significantly different from the distribution based on the study weights at the 0.05 level, and there were not sufficient data available from other non-CATI sources to include the variable in the nonresponse models.

[3]Enrollment categories were defined by quartiles based on total enrollment for the 1997-1998 school year.

NOTE: Estimated bias before CATI nonresponse adjustment is the difference between the mean for CATI respondents and nonrespondents multiplied by the weighted nonresponse rate. After weight adjustments, estimated bias is the difference between means based on the CATI weights and the study weights. To protect confidentiality of the data, some numbers have been rounded.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

Table 6.—Summary of significant nonresponse bias before CATI nonresponse adjustment by student type

Description	All students	Baccalaureate recipients	Undergraduate students	Graduate/first-professional students
Student's age	T	T		T
Student age groups	T	T	T	T
Has student received any type of aid?	T	T	T	T
Did student attend institution in the fall?	T	T	T	T
Citizenship status	T	T	T	T
CPS match	T	T	T	T
Enrollment total at the student's institution	T	T	T	T
Enrollment categories[2]	T	T	T	T
Was the student enrolled in institution in the fall?	T	T	T	T
Did the student receive any federal financial aid?	T	T	T	T
Student's sex	T	T	T	
Did the student receive any institution financial aid?	T	T	T	
Institution region	T	T	T	T
Did the student receive any Pell grants?	T		T	†
Pell categories for all Pell recipients	T			†
What was the amount of the Pell grant received?				†
Institution sector	T	T	T	T
Stafford categories for Stafford recipients[3]			T	
Amount of Stafford loan received				
Did the student receive a Stafford loan?	T	T	T	T
Did the student receive any state financial aid?	T	T	T	
Student type – sampled	T	†	T	T
Student type – CADE	T	T	†	

T denotes significance at the 0.05/(c-1) level for at least one category of the primary variable, where c is the number of categories within the primary variable.

† Not applicable

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

3. Weight Adjustments

Weight adjustments are typically used to reduce bias due to unit nonresponse, and the results in tables 1, 2, 3, 4, and 5 show that these adjustments are important for reducing the potential for nonresponse bias due to the differences between CATI respondents and nonrespondents. After computing study weights for study respondents by making various adjustments to the design-based weights, adjustments were made for CATI nonresponse. In the initial nonresponse models all variables were incorporated that were thought to be predictive of CATI nonresponse and were missing for five percent or less of all study respondents including:

- age (categorical),
- any aid receipt indicator,
- fall attendance status,
- citizenship,
- CPS record indicator,
- institution enrollment from IPEDS IC file (categorical),
- fall enrollment status,
- federal aid receipt indicator,
- sex,
- Hispanic indicator,
- institutional aid receipt indicator,
- OBE region,
- student date of birth preloaded into CATI,
- parent data preloaded into CATI,
- total number of phone numbers obtained for student,
- Social Security number indicator,
- Pell grant status,
- Pell grant amount (categorical),
- Stafford loan status,
- Stafford loan amount (categorical),
- institution type,
- state aid receipt indicator,
- number of institutions attended in 1999–2000, and
- student type.

Other variables that were considered but excluded from the "not located" model because they were missing for more than five percent of all study respondents were:

- dependents indicator, dependency status, number of dependents,
- full-year attendance status,
- high school degree indicator and type,
- high school graduation year,
- local residence,
- parents' income, parents' family size, parent's marital status,
- student's marital status

- student's income, and
- race.

Table 7 lists the predictor variables used for each of the three final nonresponse adjustment models. Dependency status and student's marital status were included in the final other nonresponse models (see discussion below of the three models). Marital status was also included in the final refusal model.

Also, a Chi-squared automatic interaction detector (CHAID) analysis was performed on the candidate predictor variables to determine important interactions. The CHAID analysis divided the data into segments that differed with respect to the response variable: not located, refusal, or other nonresponse. The segmentation process first divided the sample into groups based on categories of the most significant predictor of response. It then split each of these groups into smaller subgroups based on other predictor variables. It also merged categories of a variable that were found insignificant. This splitting and merging process continued until no more statistically significant predictors were found (or until some other stopping rule was met). The interactions from the final CHAID segments were then defined.

The resulting segment interactions and all the main effect variables were then subjected to variable screening in the logistic procedure. Variables significant at the 15 percent significance level were retained, with the exception of institution type, student type, Pell grant status, and Stafford loan status, which were retained whether or not they were significant. It was determined that Pell grant status and Stafford loan status are important predictors of federal aid receipt, so these variables were retained in all nonresponse models to preserve the population totals of these predictor variables. Additionally, institution type and student type were retained in all nonresponse models because of their importance as stratification variables.

The adjustment for CATI nonresponse was performed in three stages because the predictors of response propensity were potentially different at each stage:

(1) inability to locate the student
(2) refusal to be interviewed
(3) other non-interview

Using these three stages of nonresponse adjustment achieved greater reduction in nonresponse bias to the extent that different variables were significant predictors of response propensity at each stage. Six of the variables are only in one model as main effects, seven variables are in two models as main effects, and eight variables, including the four variables forced into all models, are in all three models as main effects. Additionally, some variables were included as a main effect in one model and as part of an interaction in another model. For example, ethnicity is a main effect in the refusal model but part of interactions in the other two models, as shown in table 7.

Table 7.—Variables used in final NPSAS:2000 CATI nonresponse models

Variable sector	Not located model	Refusal model	Other nonresponse model
Institutional sector	X	X	X
Region	X	X	X
Student type	X	X	X
Age group	X	X	
Sex	X	X	X
Institutional aid recipient	X		X
Federal aid recipient		X	
Pell grant recipient	X	X	X
Stafford loan recipient	X	X	X
Citizenship	X	X	
Ethnicity		X	
Fall enrollment	X		
Fall attendance			X
Enrollment		X	X
Number of phone numbers	X		X
Number of schools attended	X	X	X
Date of birth preloaded in CATI	X	X	X
CPS match		X	
Parent information preloaded in CATI	X		X
Marital status		X	X
Dependency			X
2 CHAID segments based on ethnicity, institutional aid receipt, and number of schools attended	X		
10 CHAID segments based on aid receipt, number of schools attended, fall attendance, region, enrollment, and age group		X	
11 CHAID segments based on citizenship, number of schools attended, ethnicity, federal aid receipt, institutional sector, fall attendance, marital status, and fall enrollment			X

NOTE: The variables institution sector, student type, receipt of Pell grant, and receipt of Stafford loan were forced into all three models.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

Poststratification to control totals was used to adjust for the potential for bias resulting from frame errors. The CATI weights were adjusted to control totals using a generalized raking procedure. The control totals established during the poststratification of the study weights also were used for the CATI weights. These control totals were for annual student enrollment, by institution type; total number of Pell grants awarded; amount of Pell grants awarded, by institution type; and amount of Stafford loans awarded, by institution type. To help reduce nonresponse bias further, additional control totals were formed for annual enrollment by student type as well as control totals by:

- sex,
- age group (less-than-24, 24–29, and 30+),
- federal aid applicant,
- federal aid receipt,
- state aid receipt,
- institution aid receipt, and
- fall attendance status.

The annual enrollment control totals by student type were obtained from the study weights so that estimates of the annual enrollment using the study or CATI weights would be the same. The other seven control totals listed above were also computed using the study weights because these variables were known for most CATI respondents and nonrespondents.

All nonresponse adjustment and poststratification models were fit using RTI's proprietary generalized exponential models (GEMs)[2], which are logistic models incorporating bounds on the adjustment factors. Section 6.1 of the NPSAS methodology report describes the weighting procedure in more detail.

4. Bias for CATI Variables

The *before-CATI nonresponse adjustment* bias was also estimated for several CATI variables that were missing for CATI nonrespondents but known for more than 90 percent of CATI respondents. For the CATI respondents, it was assumed that the respondents who initially refused to be interviewed had characteristics similar to CATI refusals, and that the respondents who were difficult to contact, based on the number of phone call attempts, had characteristics similar to students who were never located. Table 8 shows the estimated bias before adjustment under these assumptions.

The bias due to refusals was estimated as the difference between the mean for CATI respondents who were initial refusals and the mean for all other respondents, using the CATI weight. T-tests were used to test each level of the variables for significance of the bias at the 0.05/(c-1) significance level, where c is the number of categories within the primary variable. Chi-squared tests were used to test if the distribution based on the CATI weights was significantly different at the 0.05 level from the distribution based on the study weights. To conduct these statistical tests, the study and CATI respondents were combined and the study respondents based on study weights were contrasted with the CATI respondents based on CATI weights. Then, SUDAAN was used to compute the variance and to test for significant differences. SUDAAN computed the variance using institution strata and PSUs and took account of the correlation in the estimates caused by having students on both sides of the contrast.

[2] Folsom, R.E. and A.C. Singh (2000). "The Generalized Exponential Model for Sampling Weight Calibration for Extreme Values, Nonresponse, and Poststratification." Proceedings of the Section on Survey Research Methods of the American Statistical Association, pp. 598-603.

Table 8.—Nonresponse bias for CATI variables for all students

Description	Response	Mean, CATI weights			Mean, CATI weights		
		Initial refusal respondents	Other respondents	Estimated bias	Difficult to contact respondents	Other respondents	Estimated bias
Received any employer aid	Yes	11.5	9.6	1.948*[1]	8.0	10.4	-2.415*[1]
	No	88.5	90.4	-1.948*	92.0	89.6	2.415*
Worked while in school	Yes	74.6	78.7	-4.087*[1]	79.0	77.8	1.244[1]
	No	20.7	19.4	1.236	17.1	20.4	-3.335*
	Missing	4.8	1.9	2.852*	3.9	1.8	2.091*
Worked 20 or more hours per week while in school	Yes	62.9	65.5	-2.597*[1]	66.6	64.6	2.018*[1]
	No	32.4	32.6	-0.254	29.5	33.6	-4.109*
	Missing	4.8	1.9	2.852*	3.9	1.8	-4.109*
Worked multiple jobs in 1999–2000	Yes	17.0	21.2	-4.162*[1]	21.4	20.3	1.125[1]
	No	79.3	78.1	1.209	75.7	79.0	-3.362*
	Missing	3.8	0.8	2.953*	2.9	0.7	2.238*
Born outside the U.S.	Yes	7.5	12.2	-4.649*[1]	9.8	12.0	-2.119*[1]
	No	92.5	87.9	4.649*	90.2	88.0	2.119*
Registered to vote	Yes	81.5	82.4	-0.940	80.6	82.8	-2.189*[1]
	No	18.6	17.6	0.940	19.4	17.2	2.189*
Voted in the 2000 elections	Yes	71.5	78.1	-6.551*[1]	64.8	81.0	-16.202*[1]
	No	28.5	21.9	6.551*	35.2	19.0	16.202*
Has a disability	Yes	9.7	10.2	-0.557[1]	8.8	10.6	-1.777*[1]
	No	84.3	88.7	-4.429*	86.7	88.5	-1.775*
	Missing	6.1	1.1	4.986*	4.5	1.0	3.552*
Attended more than one institution in 1999–2000	Yes	5.0	6.0	-0.949*[1]	5.9	5.8	0.057
	No	95.0	94.0	0.949*	94.1	94.2	-0.057
Has dependents other than a spouse	Yes	27.8	28.7	-0.893	23.4	30.2	-6.808*[1]
	No	72.2	71.3	0.893	76.7	69.9	6.808*
Has children under 5 years old	Yes	13.8	14.5	-0.667	12.1	15.2	-3.090*[1]
	No	86.2	85.5	0.667	87.9	84.8	3.090*
Has children aged 5 to 12 years old	Yes	14.7	15.3	-0.580	11.4	16.4	-5.062*[1]
	No	85.3	84.7	0.580	88.6	83.6	5.062*
U.S. Armed Forces veteran	Yes	4.6	4.4	0.156	3.1	4.9	-1.768*[1]
	No	89.0	88.1	0.885	89.9	87.7	2.172*
	Missing	6.4	7.5	-1.041	7.0	7.4	-0.404

* Bias is significant at the 0.05/(c-1) level, where c is the number of categories within the primary variable.

[1]The distribution based on the CATI weights is significantly different at the 0.05 level from the distribution based on the study weights.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

The bias due to inability to contact the student was estimated as the difference between the mean for CATI respondents who were difficult to contact and the mean for all other respondents, using the CATI weight. Again, t-tests were performed to test the significance of the bias for each level of the variables, and Chi-Squared tests were performed to test the significance of the distributions of each variable.

The bias was generally higher when comparing difficult-to-locate students to the other respondents than when comparing the initial refusals to the other respondents. These bias estimates indicate that using the three nonresponse models was the proper approach because initial refusals differ from other respondents and difficult-to-locate students also differ from other respondents.

5. Bias After Weight Adjustments

Although tables 2 through 5 show that some bias remains after all weight adjustments for several variables, the magnitude of the residual bias shown in these tables is usually very small. The second set of columns in tables 2 through 5 shows the estimated bias after weight adjustments for the variables available for most responding and nonresponding students. The bias after weight adjustments is the difference between the means based on the CATI weights and the study weights. For all students combined, Pell grant receipt, Pell grant amount, institution sector, and student type – CADE have zero bias after weight adjustments because all students combined were controlled to known totals.

For baccalaureate recipients and graduate/first-professional students, some sectors had no students and therefore no bias. For undergraduate students, some sectors that were all or mostly comprised of undergraduate students had zero bias because all students combined were controlled to totals for sectors. For graduate/first-professional students, student type - CADE had zero bias because all students combined were controlled to graduate and first-professional student totals.

Figures 1 through 4 compare the estimated relative bias before CATI nonresponse adjustments with the estimated relative bias after weight adjustments. All four figures indicate that when the relative bias was large before CATI nonresponse adjustment, it was almost always reduced dramatically after weight adjustments. When the relative bias was small before CATI nonresponse adjustment, it stayed small after weight adjustments with occasional small increases. These figures clearly show that the CATI weight adjustments significantly reduced bias for all students combined, baccalaureate recipients, undergraduate students, and graduate/first-professional students.

The exceptions when the bias was large before CATI nonresponse adjustment and remained large after weight adjustments were due to small sample sizes. For example, in figure 3, the outlier is for undergraduate students sampled as graduate students, and in figure 4, the outliers are for graduate students in less-than-4-year institution sectors.

The absolute bias decreased after weight adjustments for many variables. For various student groups, the percentage of variable categories that did not increase after weight adjustments were:

- all students combined – 94.7 percent
- baccalaureate recipients – 79.4 percent
- undergraduate students – 89.9 percent
- graduate/first-professional students – 65.2 percent.

For all students combined, some of the Pell grant and Stafford loan amount categories had increased bias after weight adjustments. The estimated bias is not significant for these categories, and this increase occurred because Pell grant and Stafford loan amounts were poststratified to known program totals by sector (different categories than shown in the table). For baccalaureate recipients, undergraduate students, and graduate/first-professional students, the reasons for this increase were poststratification to totals for some of these variables, some sample sizes are small for some student types, and the weighting was done at the all-student level and not separately by student type.

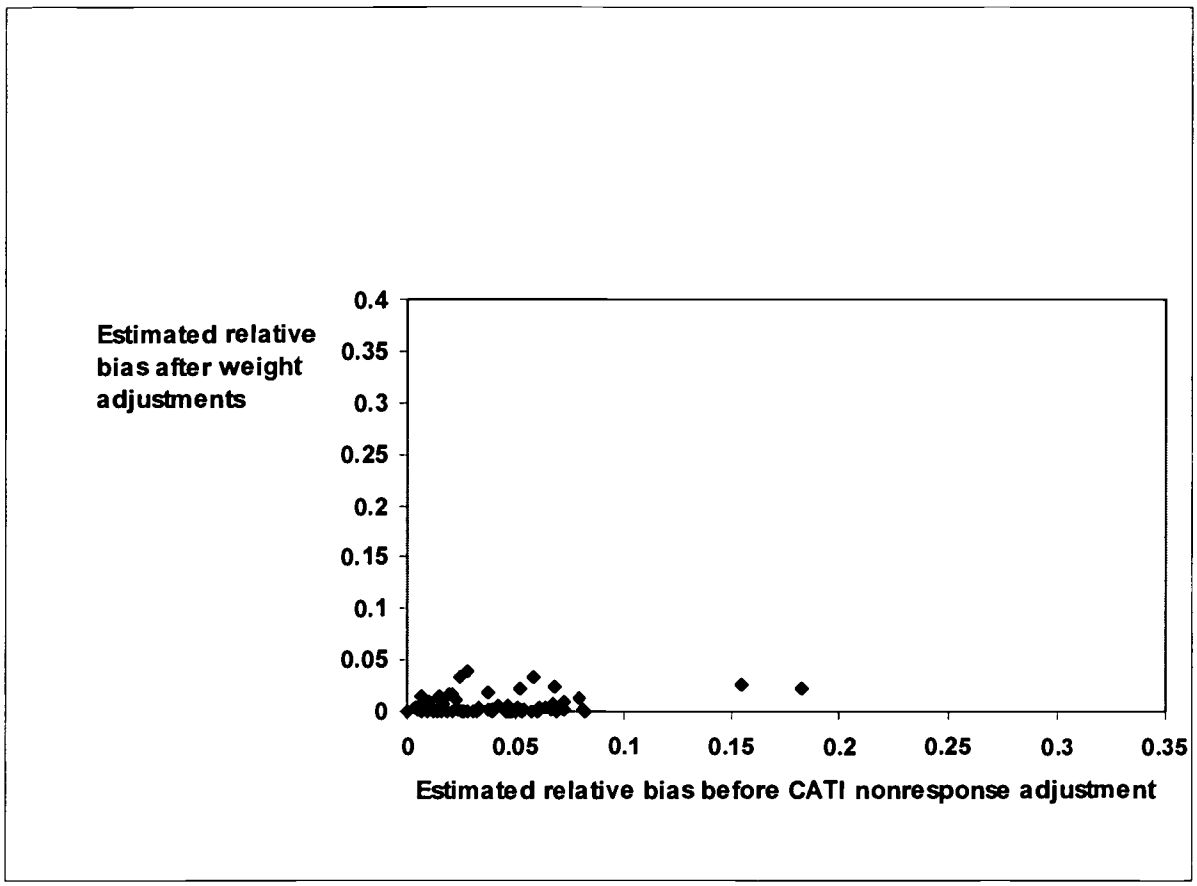
Similarly to the CATI variable bias, t-tests were performed to test the significance of the bias for each level of the variables, and Chi-Squared tests were performed to test the significance of the distributions of each variable. Below and in table 9 are summaries of the after-weighting bias across the four tables:

- for all students combined, six variables had significant t-tests and five variables had significant Chi-Squared tests
- for baccalaureate recipients, nine variables had significant t-tests and five variables had significant Chi-Squared tests
- for undergraduate students, five variables had significant t-tests and five variables had significant Chi-Squared tests
- for graduate/first-professional students, 12 variables had significant t-tests and 8 variables had significant Chi-Squared tests
- the variables attendance status and dependency status (two-levels and three-levels) had significant t-tests and Chi-Squared tests for all four student types
- student's marital status had significant t-tests for all four student types and significant Chi-squared tests for three of the student types
- significant biases are usually small and sometimes are due to small sample sizes.

There is not sufficient reported data available for the variables that are significantly biased for all students combined to eliminate the bias altogether. That is, there is too much missing data for these variables to be included as poststratification control totals. Other variables show significant bias when analyzed separately for baccalaureate recipients, undergraduate students, and graduate/first-professional students, but not for all students combined.

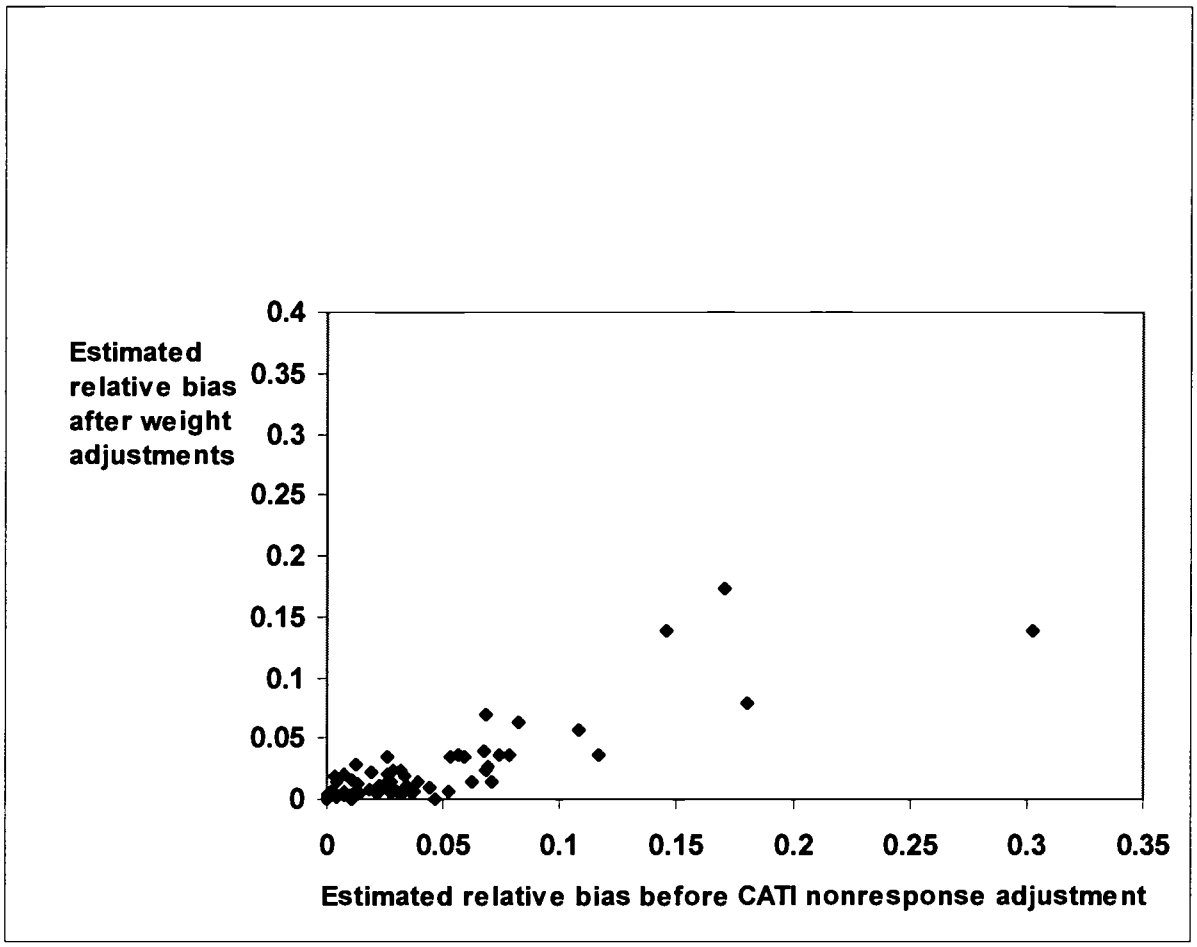
Bias remaining after weight adjustments for variables based exclusively (or primarily) upon CATI data cannot be estimated because there is no data on these variables for CATI nonrespondents. This analysis focused on the bias due to CATI nonresponse.

Figure 1.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for all students



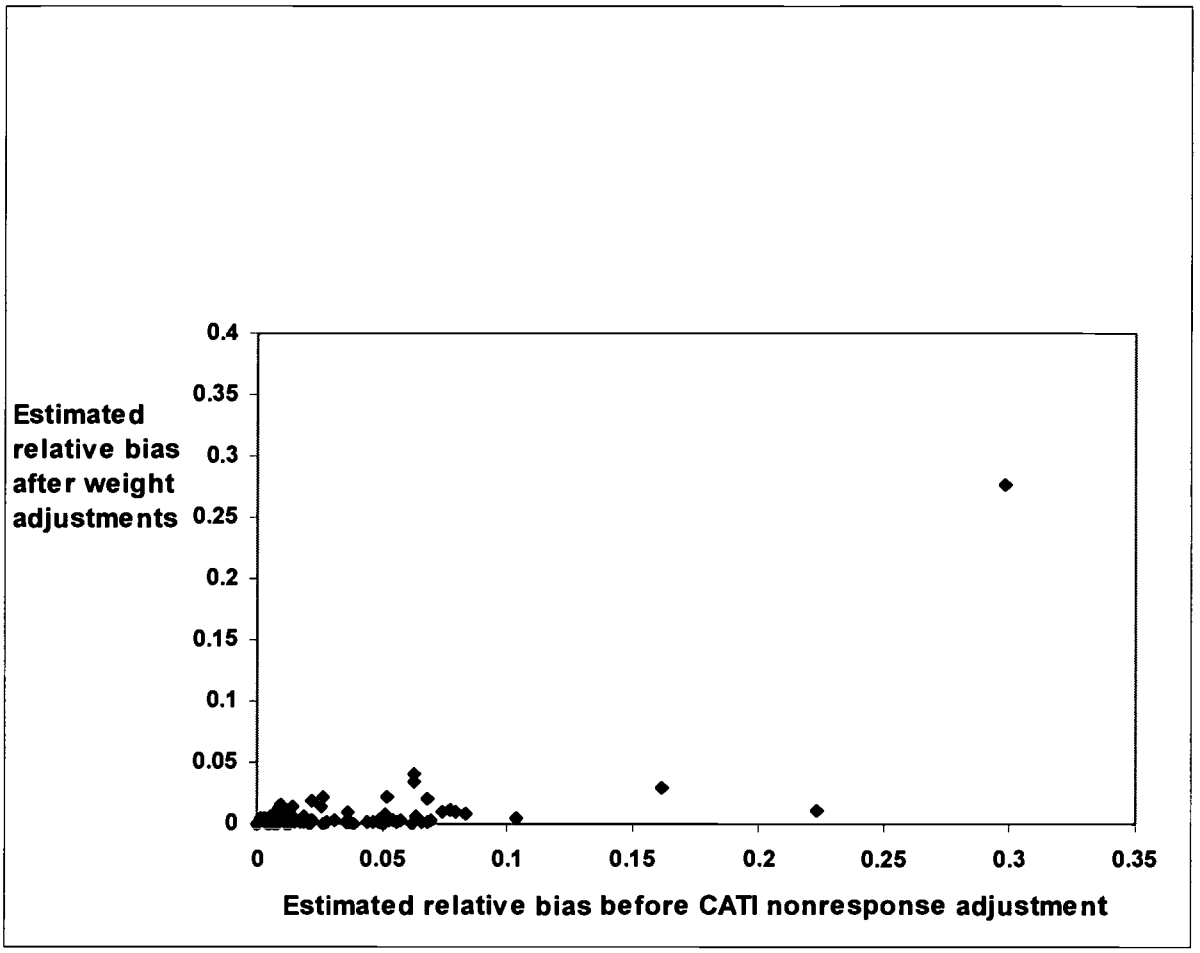
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

Figure 2.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for students sampled as baccalaureate recipients



SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

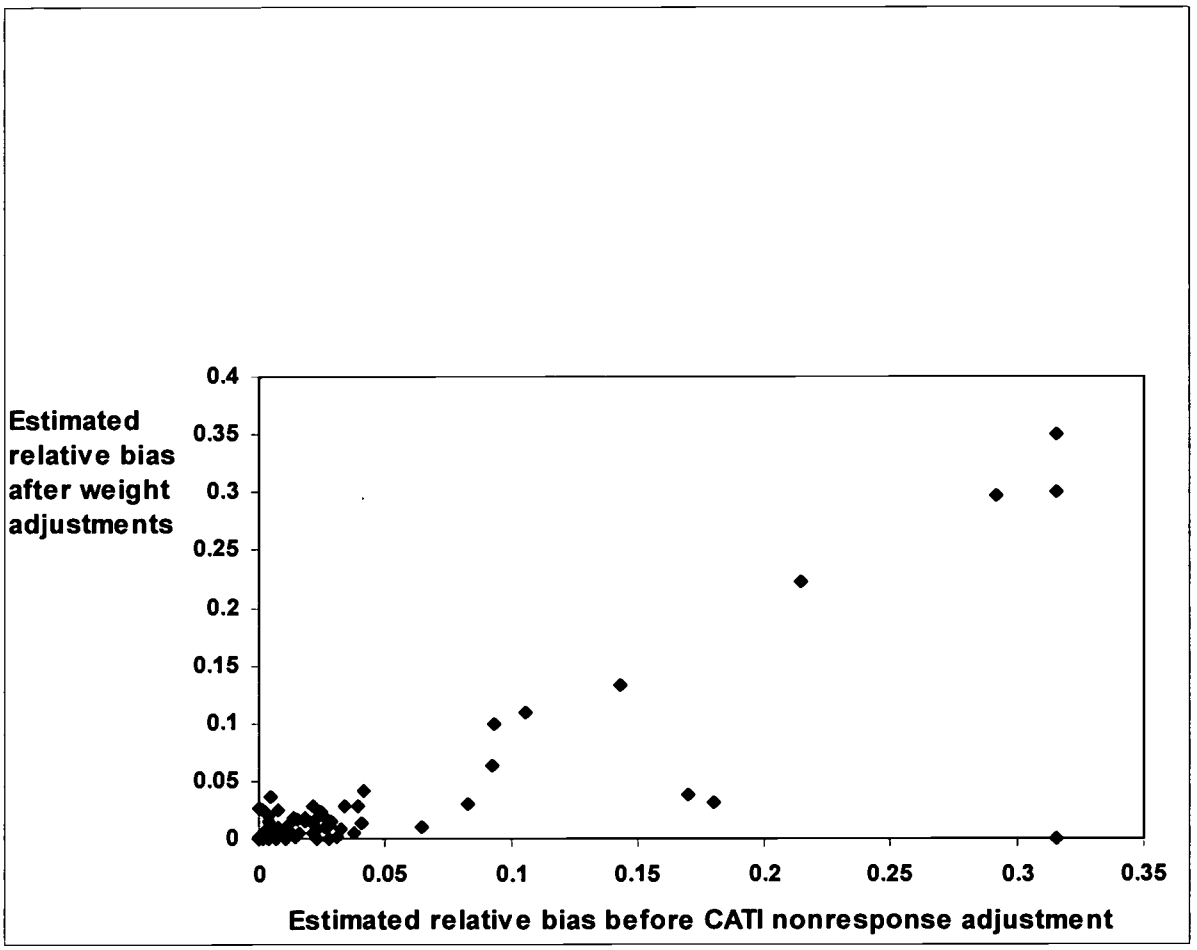
Figure 3.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for undergraduate students



Outlier due to small sample size.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

Figure 4.—Nonresponse bias before CATI nonresponse adjustment and after weight adjustments for selected variables for graduate/first professional students



Outliers due to small sample size.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

Table 9.—Summary of significant nonresponse bias after weight adjustments by student type

Description	All students	Baccalaureate recipients	Undergraduate students	Graduate/first-professional students
Student's age		T		
Student age groups		TC		T
Has student received any type of aid?				TC
Did student attend institution in the fall?				
Attendance	TC	TC	TC	TC
Citizenship status		TC		TC
CPS match				
Dependency status – two-level	TC	TC	TC	TC
Dependency status – three-level	TC	TC	TC	TC
Enrollment total at the student's institution				
Enrollment categories[2]				T
Was the student enrolled in institution in the fall?				
Did the student receive any federal financial aid?				
Student's sex				
Did the student receive any institution financial aid?				TC
Institution region	T			
Did the student receive any Pell grants?				†
Pell categories for all Pell recipients				†
What was the amount of the Pell grant received?				†
Institution sector		T		TC
Student's marital status	TC	T	TC	TC
Stafford categories for all Stafford recipients[3]				
Amount of Stafford Loan received				T
Did the student receive a Stafford loan?				
Did the student receive any state financial aid?				
Student type – sampled	TC	†	TC	T
Student type – CADE		T	†	

T denotes significance at the 0.05/(c-1) level for at least one category of the primary variable, where c is the number of categories within the primary variable.

C denotes significant difference at the 0.05 level between the distribution based on the CATI weights and the distribution based on the study weights.

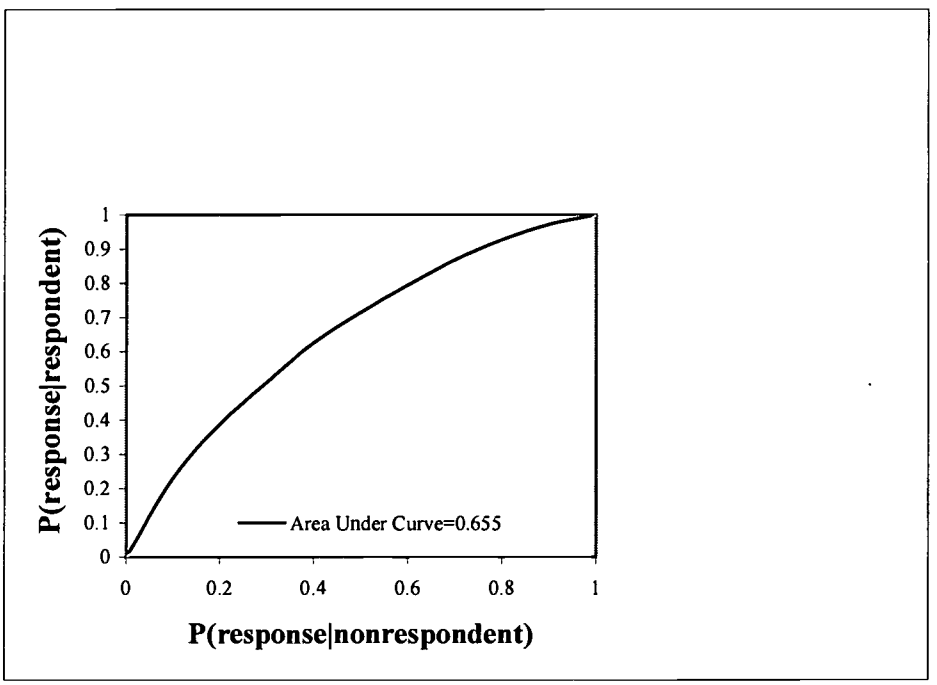
† Not applicable

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

6. ROC Curve

As described above, three nonresponse adjustment models were used. In order to assess the overall predictive ability of the combined models, a Receiver Operating Characteristics (ROC) curve was used. As shown in figure 1, the area under the ROC curve developed for the overall predicted response propensity was about 0.66 which corresponds to a highly significant Wilcoxon test statistic.[3] The curve indicates that in about two of every three randomly chosen pairs of sample students, one responding and the other nonresponding, the predicted overall response propensity of the respondent will be greater than that of the nonrespondent. This level of discrimination implies that the variables used in the three models are highly informative but not definitive predictors of a sample student's overall response propensity.

Figure 5.—ROC curve for overall response propensity



SOURCE: U.S. Department of Education, National Center for Education Statistics, National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000).

7. Conclusions

Information from multiple sources was used in weighting the data to reduce CATI nonresponse bias. Examination of variables known for most respondents and nonrespondents before CATI nonresponse adjustment revealed that some bias existed. In the initial nonresponse models all variables were incorporated that were thought to be predictive of CATI nonresponse

[3] Hanley, J.A. and B.J. McNeil (1982). "The meaning and use of the area under a receiver-operating characteristic (ROC) curve. *Diagnostic Radiology*, 143:29-36.

and were missing for five percent or less of all study respondents. Important interactions among these variables were also included in the initial models. Three nonresponse models were used to reduce bias. Comparing CATI respondents who were initial refusals with other respondents and comparing CATI respondents who were difficult to contact with other respondents also indicates that three models would help reduce bias. Using these three stages of nonresponse adjustment achieved greater reduction in nonresponse bias to the extent that different variables were significant predictors of response propensity at each stage. For poststratifying the CATI weights, control totals were used that were also used for poststratifying the study weights, and seven additional control totals were computed using the study weights for seven variables known for most respondents and nonrespondents.

The relative bias decreased considerably after weight adjustments--especially when it was large before CATI nonresponse adjustment. And the relative bias remained small after weight adjustments when it was small before CATI nonresponse adjustment. As shown in figures 1 through 4, CATI nonresponse bias was reduced using weighting techniques, and the remaining relative bias ranged from 0 to 0.35 percent.

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95–12	Rural Education Data User's Guide	Samuel Peng
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1999–05	Procedures Guide for Transcript Studies	Dawn Nelson
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96–30	Comparison of Estimates from the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler

No.	Title	NCES contact
97–02	Telephone Coverage Bias and Recorded Interviews in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97–03	1991 and 1995 National Household Education Survey Questionnaires: NHES:91 Screener, NHES:91 Adult Education, NHES:95 Basic Screener, and NHES:95 Adult Education	Kathryn Chandler
97–04	Design, Data Collection, Monitoring, Interview Administration Time, and Data Editing in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97–05	Unit and Item Response, Weighting, and Imputation Procedures in the 1993 National Household Education Survey (NHES:93)	Kathryn Chandler
97–06	Unit and Item Response, Weighting, and Imputation Procedures in the 1995 National Household Education Survey (NHES:95)	Kathryn Chandler
97–08	Design, Data Collection, Interview Timing, and Data Editing in the 1995 National Household Education Survey	Kathryn Chandler
97–19	National Household Education Survey of 1995: Adult Education Course Coding Manual	Peter Stowe
97–20	National Household Education Survey of 1995: Adult Education Course Code Merge Files User's Guide	Peter Stowe
97–25	1996 National Household Education Survey (NHES:96) Questionnaires: Screener/Household and Library, Parent and Family Involvement in Education and Civic Involvement, Youth Civic Involvement, and Adult Civic Involvement	Kathryn Chandler
97–28	Comparison of Estimates in the 1996 National Household Education Survey	Kathryn Chandler
97–34	Comparison of Estimates from the 1993 National Household Education Survey	Kathryn Chandler
97–35	Design, Data Collection, Interview Administration Time, and Data Editing in the 1996 National Household Education Survey	Kathryn Chandler
97–38	Reinterview Results for the Parent and Youth Components of the 1996 National Household Education Survey	Kathryn Chandler
97–39	Undercoverage Bias in Estimates of Characteristics of Households and Adults in the 1996 National Household Education Survey	Kathryn Chandler
97–40	Unit and Item Response Rates, Weighting, and Imputation Procedures in the 1996 National Household Education Survey	Kathryn Chandler
98–03	Adult Education in the 1990s: A Report on the 1991 National Household Education Survey	Peter Stowe
98–10	Adult Education Participation Decisions and Barriers: Review of Conceptual Frameworks and Empirical Studies	Peter Stowe
National Longitudinal Study of the High School Class of 1972 (NLS-72)		
95–12	Rural Education Data User's Guide	Samuel Peng
National Postsecondary Student Aid Study (NPSAS)		
96–17	National Postsecondary Student Aid Study: 1996 Field Test Methodology Report	Andrew G. Malizio
2000–17	National Postsecondary Student Aid Study:2000 Field Test Methodology Report	Andrew G. Malizio
2002-03	National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000), CATI Nonresponse Bias Analysis Report.	Andrew Malizio
National Study of Postsecondary Faculty (NSOPF)		
97–26	Strategies for Improving Accuracy of Postsecondary Faculty Lists	Linda Zimbler
98–15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
2000–01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler
Postsecondary Education Descriptive Analysis Reports (PEDAR)		
2000–11	Financial Aid Profile of Graduate Students in Science and Engineering	Aurora D'Amico
Private School Universe Survey (PSS)		
95–16	Intersurvey Consistency in NCES Private School Surveys	Steven Kaufman
95–17	Estimates of Expenditures for Private K–12 Schools	Stephen Broughman
96–16	Strategies for Collecting Finance Data from Private Schools	Stephen Broughman
96–26	Improving the Coverage of Private Elementary-Secondary Schools	Steven Kaufman
96–27	Intersurvey Consistency in NCES Private School Surveys for 1993–94	Steven Kaufman
97–07	The Determinants of Per-Pupil Expenditures in Private Elementary and Secondary Schools: An Exploratory Analysis	Stephen Broughman
97–22	Collection of Private School Finance Data: Development of a Questionnaire	Stephen Broughman
98–15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman

No.	Title	NCES contact
2000–04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
2000–15	Feasibility Report: School-Level Finance Pretest, Private School Questionnaire	Stephen Broughman
Recent College Graduates (RCG)		
98–15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
Schools and Staffing Survey (SASS)		
94–01	Schools and Staffing Survey (SASS) Papers Presented at Meetings of the American Statistical Association	Dan Kasprzyk
94–02	Generalized Variance Estimate for Schools and Staffing Survey (SASS)	Dan Kasprzyk
94–03	1991 Schools and Staffing Survey (SASS) Reinterview Response Variance Report	Dan Kasprzyk
94–04	The Accuracy of Teachers' Self-reports on their Postsecondary Education: Teacher Transcript Study, Schools and Staffing Survey	Dan Kasprzyk
94–06	Six Papers on Teachers from the 1990–91 Schools and Staffing Survey and Other Related Surveys	Dan Kasprzyk
95–01	Schools and Staffing Survey: 1994 Papers Presented at the 1994 Meeting of the American Statistical Association	Dan Kasprzyk
95–02	QED Estimates of the 1990–91 Schools and Staffing Survey: Deriving and Comparing QED School Estimates with CCD Estimates	Dan Kasprzyk
95–03	Schools and Staffing Survey: 1990–91 SASS Cross-Questionnaire Analysis	Dan Kasprzyk
95–08	CCD Adjustment to the 1990–91 SASS: A Comparison of Estimates	Dan Kasprzyk
95–09	The Results of the 1993 Teacher List Validation Study (TLVS)	Dan Kasprzyk
95–10	The Results of the 1991–92 Teacher Follow-up Survey (TFS) Reinterview and Extensive Reconciliation	Dan Kasprzyk
95–11	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
95–12	Rural Education Data User's Guide	Samuel Peng
95–14	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
95–15	Classroom Instructional Processes: A Review of Existing Measurement Approaches and Their Applicability for the Teacher Follow-up Survey	Sharon Bobbitt
95–16	Intersurvey Consistency in NCES Private School Surveys	Steven Kaufman
95–18	An Agenda for Research on Teachers and Schools: Revisiting NCES' Schools and Staffing Survey	Dan Kasprzyk
96–01	Methodological Issues in the Study of Teachers' Careers: Critical Features of a Truly Longitudinal Study	Dan Kasprzyk
96–02	Schools and Staffing Survey (SASS): 1995 Selected papers presented at the 1995 Meeting of the American Statistical Association	Dan Kasprzyk
96–05	Cognitive Research on the Teacher Listing Form for the Schools and Staffing Survey	Dan Kasprzyk
96–06	The Schools and Staffing Survey (SASS) for 1998–99: Design Recommendations to Inform Broad Education Policy	Dan Kasprzyk
96–07	Should SASS Measure Instructional Processes and Teacher Effectiveness?	Dan Kasprzyk
96–09	Making Data Relevant for Policy Discussions: Redesigning the School Administrator Questionnaire for the 1998–99 SASS	Dan Kasprzyk
96–10	1998–99 Schools and Staffing Survey: Issues Related to Survey Depth	Dan Kasprzyk
96–11	Towards an Organizational Database on America's Schools: A Proposal for the Future of SASS, with comments on School Reform, Governance, and Finance	Dan Kasprzyk
96–12	Predictors of Retention, Transfer, and Attrition of Special and General Education Teachers: Data from the 1989 Teacher Followup Survey	Dan Kasprzyk
96–15	Nested Structures: District-Level Data in the Schools and Staffing Survey	Dan Kasprzyk
96–23	Linking Student Data to SASS: Why, When, How	Dan Kasprzyk
96–24	National Assessments of Teacher Quality	Dan Kasprzyk
96–25	Measures of Inservice Professional Development: Suggested Items for the 1998–1999 Schools and Staffing Survey	Dan Kasprzyk
96–28	Student Learning, Teaching Quality, and Professional Development: Theoretical Linkages, Current Measurement, and Recommendations for Future Data Collection	Mary Rollefson
97–01	Selected Papers on Education Surveys: Papers Presented at the 1996 Meeting of the American Statistical Association	Dan Kasprzyk
97–07	The Determinants of Per-Pupil Expenditures in Private Elementary and Secondary Schools: An Exploratory Analysis	Stephen Broughman

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97–09	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman
97–10	Report of Cognitive Research on the Public and Private School Teacher Questionnaires for the Schools and Staffing Survey 1993–94 School Year	Dan Kasprzyk
97–11	International Comparisons of Inservice Professional Development	Dan Kasprzyk
97–12	Measuring School Reform: Recommendations for Future SASS Data Collection	Mary Rollefson
97–14	Optimal Choice of Periodicities for the Schools and Staffing Survey: Modeling and Analysis	Steven Kaufman
97–18	Improving the Mail Return Rates of SASS Surveys: A Review of the Literature	Steven Kaufman
97–22	Collection of Private School Finance Data: Development of a Questionnaire	Stephen Broughman
97–23	Further Cognitive Research on the Schools and Staffing Survey (SASS) Teacher Listing Form	Dan Kasprzyk
97–41	Selected Papers on the Schools and Staffing Survey: Papers Presented at the 1997 Meeting of the American Statistical Association	Steve Kaufman
97–42	Improving the Measurement of Staffing Resources at the School Level: The Development of Recommendations for NCES for the Schools and Staffing Survey (SASS)	Mary Rollefson
97–44	Development of a SASS 1993–94 School-Level Student Achievement Subfile: Using State Assessments and State NAEP, Feasibility Study	Michael Ross
98–01	Collection of Public School Expenditure Data: Development of a Questionnaire	Stephen Broughman
98–02	Response Variance in the 1993–94 Schools and Staffing Survey: A Reinterview Report	Steven Kaufman
98–04	Geographic Variations in Public Schools' Costs	William J. Fowler, Jr.
98–05	SASS Documentation: 1993–94 SASS Student Sampling Problems; Solutions for Determining the Numerators for the SASS Private School (3B) Second-Stage Factors	Steven Kaufman
98–08	The Redesign of the Schools and Staffing Survey for 1999–2000: A Position Paper	Dan Kasprzyk
98–12	A Bootstrap Variance Estimator for Systematic PPS Sampling	Steven Kaufman
98–13	Response Variance in the 1994–95 Teacher Follow-up Survey	Steven Kaufman
98–14	Variance Estimation of Imputed Survey Data	Steven Kaufman
98–15	Development of a Prototype System for Accessing Linked NCES Data	Steven Kaufman
98–16	A Feasibility Study of Longitudinal Design for Schools and Staffing Survey	Stephen Broughman
1999–02	Tracking Secondary Use of the Schools and Staffing Survey Data: Preliminary Results	Dan Kasprzyk
1999–04	Measuring Teacher Qualifications	Dan Kasprzyk
1999–07	Collection of Resource and Expenditure Data on the Schools and Staffing Survey	Stephen Broughman
1999–08	Measuring Classroom Instructional Processes: Using Survey and Case Study Fieldtest Results to Improve Item Construction	Dan Kasprzyk
1999–10	What Users Say About Schools and Staffing Survey Publications	Dan Kasprzyk
1999–12	1993–94 Schools and Staffing Survey: Data File User's Manual, Volume III: Public-Use Codebook	Kerry Gruber
1999–13	1993–94 Schools and Staffing Survey: Data File User's Manual, Volume IV: Bureau of Indian Affairs (BIA) Restricted-Use Codebook	Kerry Gruber
1999–14	1994–95 Teacher Followup Survey: Data File User's Manual, Restricted-Use Codebook	Kerry Gruber
1999–17	Secondary Use of the Schools and Staffing Survey Data	Susan Wiley
2000–04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
2000–10	A Research Agenda for the 1999–2000 Schools and Staffing Survey	Dan Kasprzyk
2000–13	Non-professional Staff in the Schools and Staffing Survey (SASS) and Common Core of Data (CCD)	Kerry Gruber
2000–18	Feasibility Report: School-Level Finance Pretest, Public School District Questionnaire	Stephen Broughman
Third International Mathematics and Science Study (TIMSS)		
2001–01	Cross-National Variation in Educational Preparation for Adulthood: From Early Adolescence to Young Adulthood	Elvira Hausken
2001–05	Using TIMSS to Analyze Correlates of Performance Variation in Mathematics	Patrick Gonzales
2001–07	A Comparison of the National Assessment of Educational Progress (NAEP), the Third International Mathematics and Science Study Repeat (TIMSS-R), and the Programme for International Student Assessment (PISA)	Arnold Goldstein
2002-01	Legal and Ethical Issues in the Use of Video in Education Research	Patrick Gonzales

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Achievement (student) - mathematics		
2001–05	Using TIMSS to Analyze Correlates of Performance Variation in Mathematics	Patrick Gonzales
Adult education		
96–14	The 1995 National Household Education Survey: Reinterview Results for the Adult Education Component	Steven Kaufman
96–20	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler
96–22	1995 National Household Education Survey (NHES:95) Questionnaires: Screener, Early Childhood Program Participation, and Adult Education	Kathryn Chandler
98–03	Adult Education in the 1990s: A Report on the 1991 National Household Education Survey	Peter Stowe
98–10	Adult Education Participation Decisions and Barriers: Review of Conceptual Frameworks and Empirical Studies	Peter Stowe
1999–11	Data Sources on Lifelong Learning Available from the National Center for Education Statistics	Lisa Hudson
2000–16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
2000–16b	Lifelong Learning NCES Task Force: Final Report Volume II	Lisa Hudson
Adult literacy—see Literacy of adults		
American Indian – education		
1999–13	1993–94 Schools and Staffing Survey: Data File User's Manual, Volume IV: Bureau of Indian Affairs (BIA) Restricted-Use Codebook	Kerry Gruber
Assessment/achievement		
95–12	Rural Education Data User's Guide	Samuel Peng
95–13	Assessing Students with Disabilities and Limited English Proficiency	James Houser
97–29	Can State Assessment Data be Used to Reduce State NAEP Sample Sizes?	Larry Ogle
97–30	ACT's NAEP Redesign Project: Assessment Design is the Key to Useful and Stable Assessment Results	Larry Ogle
97–31	NAEP Reconfigured: An Integrated Redesign of the National Assessment of Educational Progress	Larry Ogle
97–32	Innovative Solutions to Intractable Large Scale Assessment (Problem 2: Background Questions)	Larry Ogle
97–37	Optimal Rating Procedures and Methodology for NAEP Open-ended Items	Larry Ogle
97–44	Development of a SASS 1993–94 School-Level Student Achievement Subfile: Using State Assessments and State NAEP, Feasibility Study	Michael Ross
98–09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
2001–07	A Comparison of the National Assessment of Educational Progress (NAEP), the Third International Mathematics and Science Study Repeat (TIMSS-R), and the Programme for International Student Assessment (PISA)	Arnold Goldstein
2001–11	Impact of Selected Background Variables on Students' NAEP Math Performance	Arnold Goldstein
2001–13	The Effects of Accommodations on the Assessment of LEP Students in NAEP	Arnold Goldstein
2001–19	The Measurement of Home Background Indicators: Cognitive Laboratory Investigations of the Responses of Fourth and Eighth Graders to Questionnaire Items and Parental Assessment of the Invasiveness of These Items	Arnold Goldstein
Beginning students in postsecondary education		
98–11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico
2001–04	Beginning Postsecondary Students Longitudinal Study: 1996–2001 (BPS:1996/2001) Field Test Methodology Report	Paula Knepper

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Civic participation		
97–25	1996 National Household Education Survey (NHES:96) Questionnaires: Screener/Household and Library, Parent and Family Involvement in Education and Civic Involvement, Youth Civic Involvement, and Adult Civic Involvement	Kathryn Chandler
Climate of schools		
95–14	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
Cost of education indices		
94–05	Cost-of-Education Differentials Across the States	William J. Fowler, Jr.
Course-taking		
95–12	Rural Education Data User's Guide	Samuel Peng
98–09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
1999–05	Procedures Guide for Transcript Studies	Dawn Nelson
1999–06	1998 Revision of the Secondary School Taxonomy	Dawn Nelson
Crime		
97–09	Status of Data on Crime and Violence in Schools: Final Report	Lee Hoffman
Curriculum		
95–11	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
98–09	High School Curriculum Structure: Effects on Coursetaking and Achievement in Mathematics for High School Graduates—An Examination of Data from the National Education Longitudinal Study of 1988	Jeffrey Owings
Customer service		
1999–10	What Users Say About Schools and Staffing Survey Publications	Dan Kasprzyk
2000–02	Coordinating NCES Surveys: Options, Issues, Challenges, and Next Steps	Valena Plisko
2000–04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
2001–12	Customer Feedback on the 1990 Census Mapping Project	Dan Kasprzyk
Data quality		
97–13	Improving Data Quality in NCES: Database-to-Report Process	Susan Ahmed
2001–11	Impact of Selected Background Variables on Students' NAEP Math Performance	Arnold Goldstein
2001–13	The Effects of Accommodations on the Assessment of LEP Students in NAEP	Arnold Goldstein
2001–19	The Measurement of Home Background Indicators: Cognitive Laboratory Investigations of the Responses of Fourth and Eighth Graders to Questionnaire Items and Parental Assessment of the Invasiveness of These Items	Arnold Goldstein
Data warehouse		
2000–04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meetings	Dan Kasprzyk
Design effects		
2000–03	Strengths and Limitations of Using SUDAAN, Stata, and WesVarPC for Computing Variances from NCES Data Sets	Ralph Lee
Dropout rates, high school		
95–07	National Education Longitudinal Study of 1988: Conducting Trend Analyses HS&B and NELS:88 Sophomore Cohort Dropouts	Jeffrey Owings
Early childhood education		
96–20	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler

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96–22	1995 National Household Education Survey (NHES:95) Questionnaires: Screener, Early Childhood Program Participation, and Adult Education	Kathryn Chandler
97–24	Formulating a Design for the ECLS: A Review of Longitudinal Studies	Jerry West
97–36	Measuring the Quality of Program Environments in Head Start and Other Early Childhood Programs: A Review and Recommendations for Future Research	Jerry West
1999–01	A Birth Cohort Study: Conceptual and Design Considerations and Rationale	Jerry West
2001–02	Measuring Father Involvement in Young Children's Lives: Recommendations for a Fatherhood Module for the ECLS-B	Jerry West
2001–03	Measures of Socio-Emotional Development in Middle School	Elvira Hausken
2001–06	Papers from the Early Childhood Longitudinal Studies Program: Presented at the 2001 AERA and SRCD Meetings	Jerry West
Educational attainment		
98–11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico
2001–15	Baccalaureate and Beyond Longitudinal Study: 2000/01 Follow-Up Field Test Methodology Report	Andrew G. Malizio
Educational research		
2000–02	Coordinating NCES Surveys: Options, Issues, Challenges, and Next Steps	Valena Plisko
2002-01	Legal and Ethical Issues in the Use of Video in Education Research	Patrick Gonzales
Eighth-graders		
2001–05	Using TIMSS to Analyze Correlates of Performance Variation in Mathematics	Patrick Gonzales
Employment		
96–03	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings
98–11	Beginning Postsecondary Students Longitudinal Study First Follow-up (BPS:96–98) Field Test Report	Aurora D'Amico
2000–16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
2000–16b	Lifelong Learning NCES Task Force: Final Report Volume II	Lisa Hudson
2001–01	Cross-National Variation in Educational Preparation for Adulthood: From Early Adolescence to Young Adulthood	Elvira Hausken
Employment – after college		
2001–15	Baccalaureate and Beyond Longitudinal Study: 2000/01 Follow-Up Field Test Methodology Report	Andrew G. Malizio
Engineering		
2000–11	Financial Aid Profile of Graduate Students in Science and Engineering	Aurora D'Amico
Enrollment – after college		
2001–15	Baccalaureate and Beyond Longitudinal Study: 2000/01 Follow-Up Field Test Methodology Report	Andrew G. Malizio
Faculty – higher education		
97–26	Strategies for Improving Accuracy of Postsecondary Faculty Lists	Linda Zimbler
2000–01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler
Fathers – role in education		
2001–02	Measuring Father Involvement in Young Children's Lives: Recommendations for a Fatherhood Module for the ECLS-B	Jerry West
Finance – elementary and secondary schools		
94–05	Cost-of-Education Differentials Across the States	William J. Fowler, Jr.
96–19	Assessment and Analysis of School-Level Expenditures	William J. Fowler, Jr.
98–01	Collection of Public School Expenditure Data: Development of a Questionnaire	Stephen Broughman
1999–07	Collection of Resource and Expenditure Data on the Schools and Staffing Survey	Stephen Broughman
1999–16	Measuring Resources in Education: From Accounting to the Resource Cost Model Approach	William J. Fowler, Jr.

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2000–18	Feasibility Report: School-Level Finance Pretest, Public School District Questionnaire	Stephen Broughman
2001–14	Evaluation of the Common Core of Data (CCD) Finance Data Imputations	Frank Johnson
Finance – postsecondary		
97–27	Pilot Test of IPEDS Finance Survey	Peter Stowe
2000–14	IPEDS Finance Data Comparisons Under the 1997 Financial Accounting Standards for Private, Not-for-Profit Institutes: A Concept Paper	Peter Stowe
Finance – private schools		
95–17	Estimates of Expenditures for Private K–12 Schools	Stephen Broughman
96–16	Strategies for Collecting Finance Data from Private Schools	Stephen Broughman
97–07	The Determinants of Per-Pupil Expenditures in Private Elementary and Secondary Schools: An Exploratory Analysis	Stephen Broughman
97–22	Collection of Private School Finance Data: Development of a Questionnaire	Stephen Broughman
1999–07	Collection of Resource and Expenditure Data on the Schools and Staffing Survey	Stephen Broughman
2000–15	Feasibility Report: School-Level Finance Pretest, Private School Questionnaire	Stephen Broughman
Geography		
98–04	Geographic Variations in Public Schools' Costs	William J. Fowler, Jr.
Graduate students		
2000–11	Financial Aid Profile of Graduate Students in Science and Engineering	Aurora D'Amico
Graduates of postsecondary education		
2001–15	Baccalaureate and Beyond Longitudinal Study: 2000/01 Follow-Up Field Test Methodology Report	Andrew G. Malizio
Imputation		
2000–04	Selected Papers on Education Surveys: Papers Presented at the 1998 and 1999 ASA and 1999 AAPOR Meeting	Dan Kasprzyk
2001–10	Comparison of Proc Impute and Schafer's Multiple Imputation Software	Sam Peng
2001–14	Evaluation of the Common Core of Data (CCD) Finance Data Imputations	Frank Johnson
2001–16	Imputation of Test Scores in the National Education Longitudinal Study of 1988	Ralph Lee
2001–17	A Study of Imputation Algorithms	Ralph Lee
2001–18	A Study of Variance Estimation Methods	Ralph Lee
Inflation		
97–43	Measuring Inflation in Public School Costs	William J. Fowler, Jr.
	Institution data	
2000–01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler
Instructional resources and practices		
95–11	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
1999–08	Measuring Classroom Instructional Processes: Using Survey and Case Study Field Test Results to Improve Item Construction	Dan Kasprzyk
International comparisons		
97–11	International Comparisons of Inservice Professional Development	Dan Kasprzyk
97–16	International Education Expenditure Comparability Study: Final Report, Volume I	Shelley Burns
97–17	International Education Expenditure Comparability Study: Final Report, Volume II, Quantitative Analysis of Expenditure Comparability	Shelley Burns
2001–01	Cross-National Variation in Educational Preparation for Adulthood: From Early Adolescence to Young Adulthood	Elvira Hausken
2001–07	A Comparison of the National Assessment of Educational Progress (NAEP), the Third International Mathematics and Science Study Repeat (TIMSS-R), and the Programme for International Student Assessment (PISA)	Arnold Goldstein
International comparisons – math and science achievement		
2001–05	Using TIMSS to Analyze Correlates of Performance Variation in Mathematics	Patrick Gonzales

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Libraries		
94–07	Data Comparability and Public Policy: New Interest in Public Library Data Papers Presented at Meetings of the American Statistical Association	Carrol Kindel
97–25	1996 National Household Education Survey (NHES:96) Questionnaires: Screener/Household and Library, Parent and Family Involvement in Education and Civic Involvement, Youth Civic Involvement, and Adult Civic Involvement	Kathryn Chandler
	Limited English Proficiency	
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2001–13	The Effects of Accommodations on the Assessment of LEP Students in NAEP	Arnold Goldstein
Literacy of adults		
98–17	Developing the National Assessment of Adult Literacy: Recommendations from Stakeholders	Sheida White
1999–09a	1992 National Adult Literacy Survey: An Overview	Alex Sedlacek
1999–09b	1992 National Adult Literacy Survey: Sample Design	Alex Sedlacek
1999–09c	1992 National Adult Literacy Survey: Weighting and Population Estimates	Alex Sedlacek
1999–09d	1992 National Adult Literacy Survey: Development of the Survey Instruments	Alex Sedlacek
1999–09e	1992 National Adult Literacy Survey: Scaling and Proficiency Estimates	Alex Sedlacek
1999–09f	1992 National Adult Literacy Survey: Interpreting the Adult Literacy Scales and Literacy Levels	Alex Sedlacek
1999–09g	1992 National Adult Literacy Survey: Literacy Levels and the Response Probability Convention	Alex Sedlacek
1999–11	Data Sources on Lifelong Learning Available from the National Center for Education Statistics	Lisa Hudson
2000–05	Secondary Statistical Modeling With the National Assessment of Adult Literacy: Implications for the Design of the Background Questionnaire	Sheida White
2000–06	Using Telephone and Mail Surveys as a Supplement or Alternative to Door-to-Door Surveys in the Assessment of Adult Literacy	Sheida White
2000–07	"How Much Literacy is Enough?" Issues in Defining and Reporting Performance Standards for the National Assessment of Adult Literacy	Sheida White
2000–08	Evaluation of the 1992 NALS Background Survey Questionnaire: An Analysis of Uses with Recommendations for Revisions	Sheida White
2000–09	Demographic Changes and Literacy Development in a Decade	Sheida White
2001–08	Assessing the Lexile Framework: Results of a Panel Meeting	Sheida White
Literacy of adults – international		
97–33	Adult Literacy: An International Perspective	Marilyn Binkley
Mathematics		
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1999–08	Measuring Classroom Instructional Processes: Using Survey and Case Study Field Test Results to Improve Item Construction	Dan Kasprzyk
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Parental involvement in education		
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1999–01	A Birth Cohort Study: Conceptual and Design Considerations and Rationale	Jerry West

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2001–06	Papers from the Early Childhood Longitudinal Studies Program: Presented at the 2001 AERA and SRCD Meetings	Jerry West
2001–19	The Measurement of Home Background Indicators: Cognitive Laboratory Investigations of the Responses of Fourth and Eighth Graders to Questionnaire Items and Parental Assessment of the Invasiveness of These Items	Arnold Goldstein
Participation rates		
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Postsecondary education		
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2000–16a	Lifelong Learning NCES Task Force: Final Report Volume I	Lisa Hudson
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Postsecondary education – persistence and attainment		
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1999–15	Projected Postsecondary Outcomes of 1992 High School Graduates	Aurora D'Amico
Postsecondary education – staff		
97–26	Strategies for Improving Accuracy of Postsecondary Faculty Lists	Linda Zimbler
2000–01	1999 National Study of Postsecondary Faculty (NSOPF:99) Field Test Report	Linda Zimbler
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2000–10	A Research Agenda for the 1999–2000 Schools and Staffing Survey	Dan Kasprzyk
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